ID 9518
3B
3-1-1991

FMC Corporation

Phosphorus Chemicals Division

RCRA Part B Permit Application

March 1, 1991

Pocatello

Submitted to EPA Region X

Volume 1

Sections A – C

FMC Corporation

Phosphorus Chemicals Division
Box 4111
Highway 30 West
Pocatello, Idaho 83202
(208) 236-8200
FAX (208) 236-8396

FMC

March 1, 1991

Dana A. Rasmussen
EPA, Region X
Mail Stop HW 112
Permit Section
1200 Sixth Avenue
Seattle, WA 98101

Subject: Amended RCRA Part A Application
New RCRA Part B Application

Dear Ms. Rasmussen:

Attached is an amended Part A Hazardous Waste Permit Application and a completed Part B application for a Hazardous Waste Treatment, Storage, and Disposal Facility for FMC's elemental phosphorus plant in Pocatello, Idaho. The Consolidated Permits Form 1 submitted to you on February 27, 1990, by FMC is still valid. In addition, FMC has enclosed a complete RCRA Part B permit application for those Units at the Pocatello elemental phosphorus plant managing hazardous waste. The twelve units presented in the application correspond to the amended Part A.

FMC considers drawings and figures that are stamped "Confidential Business Information" to be Confidential as outlined in 40 CFR 270.12. FMC understands that these drawings and figures are protected from public disclosure.

If you have any question or comments, please feel free to contact Jim Sieverson, Environmental Manager at (208) 236-8200.

Sincerely,

JT Bernasek

J. T. Bernasek
Resident Manager

A Amended Part A Application

Section A

AMENDED PART A PERMIT APPLICATION

The amended Part A presents twelve hazardous waste management units (WMUs) operating at the FMC Pocatello elemental phosphorus facility. Three of these waste management units (4, 5 and 7) were called closure management units in the previous Part A submittal because they are being closed. They will still be closed but are now referred to as waste management units.

The previous WMU #2, hazardous waste landfill, was not built because FMC decided to ship the Andersen filter media off-site for disposal. Therefore, the amended Part A changes WMU #2 from a landfill to a storage area.

Also, note that WMU #6 is a waste pile for the storage of dried furnace off-gas solids, and not pond 9S as previously stated. It is, however, located in the excavation that was pond 9S.

In addition to the above changes, five waste management units have been added:

- WMU #8 - Phossy Water Clarifier Surface Impoundments (Ponds 11S, 12S, 13S, and 14S)
- WMU #9 - Precipitator Slurry Drying Surface Impoundment (Pond 9E)
- WMU #10 - Phossy Waste Surface Impoundment (Pond 16S) (Planned)
- WMU #11 - Precipitator Slurry Surface Impoundment (Pond 8E)
- WMU #12 - Scrubber Blowdown Waste Water Treatment Unit

The Part B application which follows discusses the hazardous wastes and the waste management units at this facility.

For EPA Regional Use Only

Date Received
Month Day Year

EPA
United States Environmental Protection Agency
Washington, DC 20460

Hazardous Waste Permit Application Part A

(Read the Instructions before starting)

For State Use Only

I. ID Number(s)

A. EPA ID Number: I D D 0 7 0 9 2 9 5 1 8

B. Secondary ID Number (if applicable):

II. Name of Facility

F M C C O R P O R A T I O N

III. Facility Location (Physical address not P.O. Box or Route Number)

A. Street: 3 Miles West of Pocatello

Street (continued):

City or Town: Pocatello

State: ID

ZIP Code: 83202 -

County Code (if known):

County Name: Power County

B. Land Type (enter code): I

C. Geographic Location

LATITUDE (degrees, minutes, & seconds): 42 55 00.0

LONGITUDE (degrees, minutes, & seconds): 112 32 03.0

D. Facility Existence Date

Month Day Year: 07 27 1949

IV. Facility Mailing Address

Street or P.O. Box: PO Box 4111

City or Town: Pocatello

State: ID

ZIP Code: 83202 -

V. Facility Contact (Person to be contacted regarding waste activities at facility)

Name (last): Bernasek

(first): J Thomas

Job Title: Plant Manager

Phone Number (area code and number): 208-236-8200

VI. Facility Contact Address (See instructions)

A. Contact Address

Location:

Mailing: X

B. Street or P.O. Box:

City or Town:

State:

ZIP Code: -

EPA I.D. Number (enter from page 1): I D D 0 7 0 9 2 9 5 1 8

Secondary ID Number (enter from page 1):

VII. Operator Information (see instructions)

Name of Operator: F M C C O R P O R A T I O N

Street or P.O. Box: P O B O X 4 1 1 1

City or Town: P o c a t e l l o | State: I D | ZIP Code: 8 3 2 0 2 -

Phone Number (area code and number): 2 0 8 - 2 3 6 - 8 2 0 0

B. Operator Type: P

C. Change of Operator Indicator: Yes [ ] No [X]

Date Changed: Month Day Year

VIII. Facility Owner (see instructions)

A. Name of Facility's Legal Owner: F M C C O R P O R A T I O N

Street or P.O. Box: P O B O X 4 1 1 1

City or Town: P o c a t e l l o | State: I D | ZIP Code: 8 3 2 0 2 -

Phone Number (area code and number): 2 0 8 - 2 3 6 - 8 2 0 0

B. Owner Type: P

C. Change of Owner Indicator: Yes [ ] No [X]

Date Changed: Month Day Year

IX. SIC Codes (4-digit, in order of significance)

Primary	(description)	Secondary	(description)
2 8 1 9	Inorganic Chemical-Other		

Secondary	(description)	Secondary	(description)

X. Other Environmental Permits (see instructions)

A. Permit Type (enter code)	B. Permit Number	C. Description
N	I D - 0 0 0 2 2 - 1	National Pollutant Discharge Elim. Sys.
E	1 3 - 1 2 6 0 - 0 0 0 5	State Air Pollution Source Permit

EPA I.D. Number (enter from page 1)	Secondary ID Number (enter from page 1)
I D D 0 7 0 9 2 9 5 1 8	

XI. Nature of Business (provide a brief description)

The FMC Facility near Pocatello, Idaho produces elemental phosphorus from phosphorus shale. Raw ore is formed into briquets, mixed with silica and coke, and fed into electric arc furnaces. The elemental phosphorus is given off in a gaseous form which is then condensed and loaded into rail cars for shipment to other FMC plants.

XII. Process - Codes and Design Capacities

A. PROCESS CODE - *Enter the code from the list of process codes below that best describes each process to be used at the facility. Twelve lines are provided for entering codes. If more lines are needed, attach a separate sheet of paper with the additional information. If a process will be used that is not included in the list of codes below, then describe the process (including its design capacity) in the space provided in Item XIII.*

B. PROCESS DESIGN CAPACITY - *For each code entered in column A, enter the capacity of the process.*

1. **AMOUNT** - *Enter the amount. In a case where design capacity is not applicable (such as in a closure/post-closure or enforcement action) enter the total amount of waste for that process unit.*
2. **UNIT OF MEASURE** - *For each amount entered in column B(1), enter the code from the list of unit measure codes below that describes the unit of measure used. Only the units of measure that are listed below should be used.*

C. PROCESS TOTAL NUMBER OF UNITS - *Enter the total number of units used with the corresponding process code.*

PROCESS CODE	PROCESS	APPROPRIATE UNITS OF MEASURE FOR PROCESS DESIGN CAPACITY
	DISPOSAL:	
D79	INJECTION WELL	GALLONS; LITERS; GALLONS PER DAY; OR LITERS PER DAY
D80	LANDFILL	ACRE-FEET OR HECTARE-METER
D81	LAND APPLICATION	ACRES OR HECTARES
D82	OCEAN DISPOSAL	GALLONS PER DAY OR LITERS PER DAY
D83	SURFACE IMPOUNDMENT	GALLONS OR LITERS
	STORAGE:	
S01	CONTAINER (barrel, drum, etc.)	GALLONS OR LITERS
S02	TANK	GALLONS OR LITERS
S03	WASTE PILE	CUBIC YARDS OR CUBIC METERS
S04	SURFACE IMPOUNDMENT	GALLONS OR LITERS
	TREATMENT:	
T01	TANK	GALLONS PER DAY OR LITERS PER DAY
T02	SURFACE IMPOUNDMENT	GALLONS PER DAY OR LITERS PER DAY
T03	INCINERATOR	SHORT TONS PER HOUR; METRIC TONS PER HOUR; GALLONS PER HOUR; LITERS PER HOUR; OR BTU'S PER HOUR
T04	OTHER TREATMENT (Use for physical, chemical, thermal or biological treatment processes not occurring in tanks, surface impoundment or incinerators. Describe the processes in the space provided in Item XIII.)	GALLONS PER DAY; LITERS PER DAY; POUNDS PER HOUR; SHORT TONS PER HOUR; KILOGRAMS PER HOUR; METRIC TONS PER DAY; METRIC TONS PER HOUR; OR SHORT TONS PER DAY

UNIT OF MEASURE	UNIT OF MEASURE CODE
GALLONS	G
GALLONS PER HOUR	E
GALLONS PER DAY	U
LITERS	L
LITERS PER HOUR	H
LITERS PER DAY	V
SHORT TONS PER HOUR	D
METRIC TONS PER HOUR	W
SHORT TONS PER DAY	N
METRIC TONS PER DAY	S
POUNDS PER HOUR	J
KILOGRAMS PER HOUR	R
CUBIC YARDS	Y
CUBIC METERS	C
ACRES	B
ACRE-FEET	A
HECTARES	Q
HECTARE-METER	F
BTU's PER HOUR	K

Please print or type with ELITE type (12 characters per inch) in the unshaded areas only

Form Approved. OMB No. 2050-0034 Expires 12-31-91
GSA No. 0246-EPA-OT

EPA I.D. Number (enter from page 1)	Secondary ID Number (enter from page 1)
I D D 0 7 0 9 2 9 5 1 8	

XII. Process – Codes and Design Capacities (continued)

EXAMPLE FOR COMPLETING ITEM XII (shown in line numbers X-1 and X-2 below): A facility has two storage tanks, one tank can hold 200 gallons and the other can hold 400 gallons. The facility also has an incinerator that can burn up to 20 gallons per hour.

Line Number	A. PROCESS CODE (from list above)	B. PROCESS DESIGN CAPACITY 1. AMOUNT (specify)	B. 2. UNIT OF MEASURE (enter code)	C. PROCESS TOTAL NUMBER OF UNITS	FOR OFFICIAL USE ONLY
X 1	S 0 2	600	G	0 0 2	
X 2	T 0 3	20	E	0 0 1	
1	S 0 1	40	Y	0 0 1	
2	S 0 1	1,430	G	0 0 1	
3	S 0 1	22,000	Y	0 0 1	
4	S 0 4	60,900,000	G	0 0 4	
5	S 0 4	4,300,000	G	0 0 2	
6	S 0 4	120,000	G	0 0 1	
7	T 0 1	12.0	D	0 0 1	
8	T 0 1	50,000	E	0 0 1	
9					
10					
11					
12					

NOTE: If you need to list more than 12 process codes, attach an additional sheet(s) with the information in the same format as above. Number the lines sequentially, taking into account any lines that will be used for additional treatment processes in item XIII.

XIII. Additional Treatment Processes (follow instructions from Item XII)

Line Number (enter numbers in sequence with Item XII)	A. PROCESS CODE	B. TREATMENT PROCESS DESIGN CAPACITY 1. AMOUNT (specify)	B. 2. UNIT OF MEASURE (enter code)	C. PROCESS TOTAL NUMBER OF UNITS	D. DESCRIPTION OF PROCESS
	T 0 4				
	T 0 4				
	T 0 4				
	T 0 4				

EPA I.D. Number (enter from page 1): I D D 0 7 0 9 2 9 5 1 8

Secondary ID Number (enter from page 1):

XIV. Description of Hazardous Wastes

A. EPA HAZARDOUS WASTE NUMBER – Enter the four-digit number from 40 CFR, Part 261 Subpart D of each listed hazardous waste you will handle. For hazardous wastes which are not listed in 40 CFR, Part 261 Subpart D, enter the four-digit number(s) from 40 CFR, Part 261 Subpart C that describes the characteristics and/or the toxic contaminants of those hazardous wastes.

B. ESTIMATED ANNUAL QUANTITY – For each listed waste entered in column A estimate the quantity of that waste that will be handled on an annual basis. For each characteristic or toxic contaminant entered in column A estimate the total annual quantity of all the non-listed waste(s) that will be handled which possess that characteristic or contaminant.

C. UNIT OF MEASURE – For each quantity entered in column B enter the unit of measure code. Units of measure which must be used and the appropriate codes are:

ENGLISH UNIT OF MEASURE	CODE	METRIC UNIT OF MEASURE	CODE
POUNDS	P	KILOGRAMS	K
TONS	T	METRIC TONS	M

If facility records use any other unit of measure for quantity, the units of measure must be converted into one of the required units of measure taking into account the appropriate density or specific gravity of the waste.

D. PROCESSES

1. PROCESS CODES:

For listed hazardous waste: For each listed hazardous waste entered in column A select the code(s) from the list of process codes contained in Item XII A. on page 3 to indicate how the waste will be stored, treated, and/or disposed of at the facility.

For non-listed hazardous waste: For each characteristic or toxic contaminant entered in column A, select the code(s) from the list of process codes contained in Item XII A. on page 3 to indicate all the processes that will be used to store, treat, and/or dispose of all the non-listed hazardous wastes that processes that characteristic or toxic contaminant.

NOTE: THREE SPACES ARE PROVIDED FOR ENTERING PROCESS CODES. IF MORE ARE NEEDED:

1. Enter the first two as described above.
2. Enter "000" in the extreme right box of Item XIV-D(1).
3. Enter in the space provided on page 7, Item XIV-E, the line number and the additional code(s).

2. PROCESS DESCRIPTION: If a code is not listed for a process that will be used, describe the process in the space provided on the form (D.(2)).

NOTE: HAZARDOUS WASTES DESCRIBED BY MORE THAN ONE EPA HAZARDOUS WASTE NUMBER – Hazardous wastes that can be described by more than one EPA Hazardous Waste Number shall be described on the form as follows:

1. Select one of the EPA Hazardous Waste Numbers and enter it in column A. On the same line complete columns B, C, and D by estimating the total annual quantity of the waste and describing all the processes to be used to treat, store, and/or dispose of the waste.
2. In column A of the next line enter the other EPA Hazardous Waste Number that can be used to describe the waste. In column D(2) on that line enter "Included with above" and make no other entries on that line.
3. Repeat step 2 for each EPA Hazardous Waste Number that can be used to describe the hazardous waste.

EXAMPLE FOR COMPLETING ITEM XIV (shown in line numbers X-1, X-2, X-3, and X-4 below) – A facility will treat and dispose of an estimated 900 pounds per year of chrome shavings from leather tanning and finishing operation. In addition, the facility will treat and dispose of three non-listed wastes. Two wastes are corrosive only and there will be an estimated 200 pounds per year of each waste. The other waste is corrosive and ignitable and there will be an estimated 100 pounds per year of that waste. Treatment will be in an incinerator and disposal will be in a landfill.

Line Number	A. EPA HAZARD WASTE NO. (enter code)	B. ESTIMATED ANNUAL QUANTITY OF WASTE	C. UNIT OF MEASURE (enter code)	D. PROCESS (1) PROCESS CODES (enter)	D. PROCESS (2) PROCESS DESCRIPTION (If a code is not entered in D(1))
X 1	K 0 5 4	900	P	T 0 3 D 8 0	
X 2	D 0 0 2	400	P	T 0 3 D 8 0	
X 3	D 0 0 1	100	P	T 0 3 D 8 0	
X 4	D 0 0 2				Included With Above

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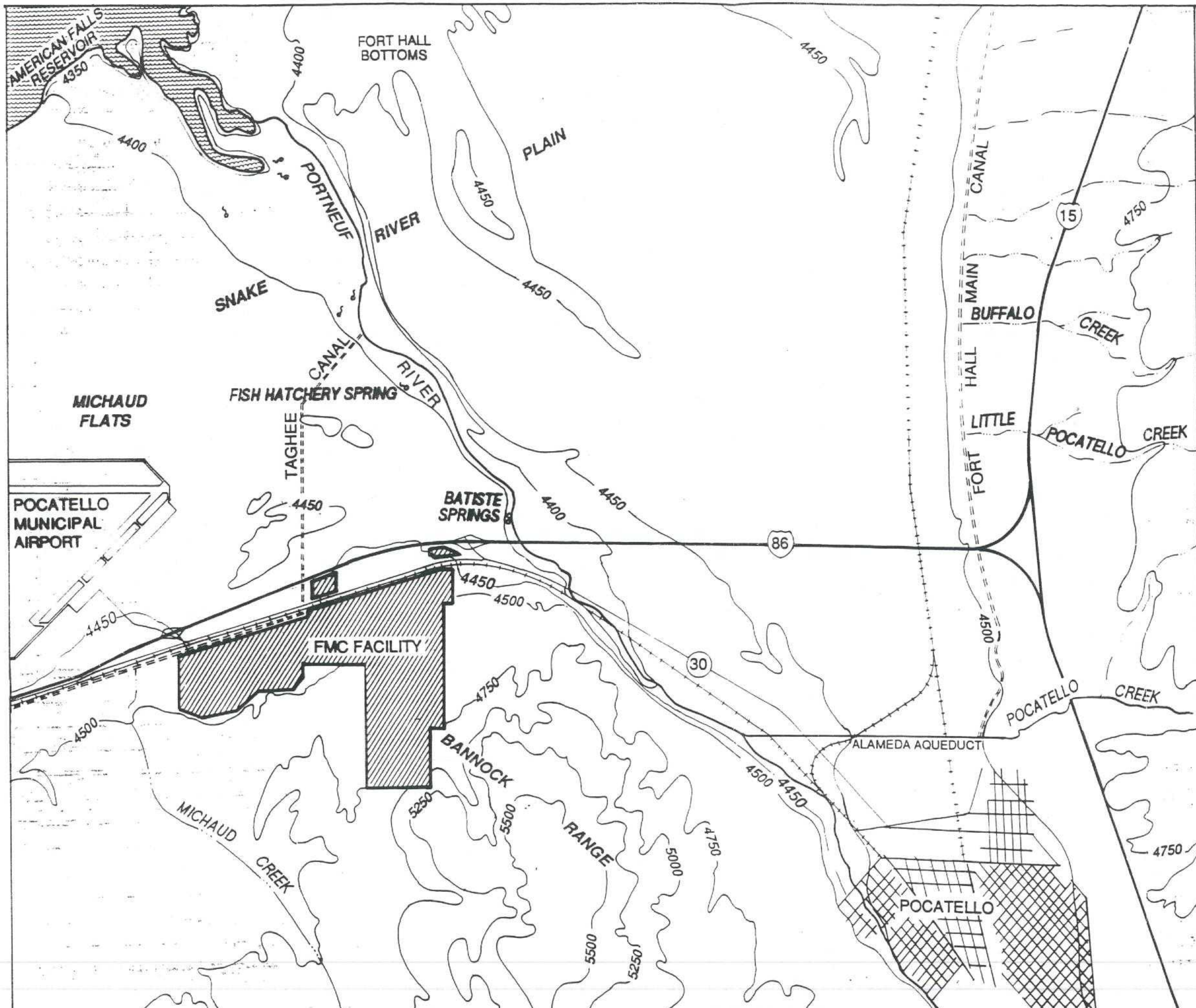
GSA No. 0246-EPA-OT

EPA I.D. Number (enter from page 1)	Secondary ID Number (enter from page 1)
I D D 0 7 0 9 2 9 5 1 8	

XIV. Description of Hazardous Wastes (continued)

Line Number	A. EPA Hazardous Waste No. (enter code)	B. Estimated Annual Quantity of Waste	C. Unit of Measure (enter code)	D. Processes (1) Process Codes (enter)	D. Processes (2) Process Description (if a code is not entered in D(1))
1	D004	50	T	S01	Covered 20 yd Gondola
2	D006	–	–		Included with above
3	D001	4	T	S01	Drum Storage
4	D003	–	–	– – –	Included with above
5	F001	–	–	– – –	Included with above
6	F003	–	–	– – –	Included with above
7	F005	–	–	– – –	Included with above
8	D006	14,000	T	S03	Off-gas Solids
9	D006	36,000	T	S04	Phossy Waste
10	– – – –	0	T	S04	Pond 8S
11	D006	120,000	T	S04	Slag Pit Waste Water Sump
12	– – – –	8,500	T	T01	Pond 8S Recovery Process
13	D006	298,000	T	T01	Scrubber Blowdown WWT Tank
14					
15					
16			S03 not listed on page 4.		
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
31					
32					
33					



BECHTEL ENVIRONMENTAL, INC. SAN FRANCISCO
FMC CORPORATION POCATELLO, IDAHO
REGIONAL SURFACE-WATER FEATURES
BECHTEL — 20906 — A-2

EPA I.D. Number (enter from page 1)

I	D	D	0	7	0	9	2	9	5	1	8

Secondary ID Number (enter from page 1)

XIV. Description of Hazardous Waste (continued)

E. USE THIS SPACE TO LIST ADDITIONAL PROCESS CODES FROM ITEM D(1) ON PAGE 6.

Line Number	Additional Process Codes (enter)

XV. Map

Attach to this application a topographic map of the area extending to at least one mile beyond property boundaries. The map must show the outline of the facility, the location of each of its existing and proposed intake and discharge structures, each of its hazardous waste treatment, storage, or disposal facilities, and each well where it injects fluids underground. Include all springs, rivers and other surface water bodies in this map area. See instructions for precise requirements.

XVI. Facility Drawing

All existing facilities must include a scale drawing of the facility (see instructions for more detail).

XVII. Photographs

All existing facilities must include photographs (aerial or ground-level) that clearly delineate all existing structures; existing storage, treatment and disposal areas; and sites of future storage, treatment or disposal areas (see instructions for more detail).

XVIII. Certification(s)

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Owner Signature	Date Signed
[signature]	2/21/91

Name and Official Title *(type or print)*
William F. Beck, Vice President and Group Manager, Chemical Products Group

Operator Signature	Date Signed
[signature]	2/21/91

Name and Official Title *(type or print)*
William F. Beck, Vice President and Group Manager, Chemical Products Group

XIX. Comments

Note: Mail completed form to the appropriate EPA Regional or State Office. (refer to instructions for more information)

Andersen Filter Media Storage Area
WMU #2

Phossy Water Clarifier Surface Impoundments
WMU #8

Scrubber Blowdown Waste Water Treatment Unit
WMU #12

Precipitator Slurry Drying Surface Impoundment
WMU #9

Precipitator Slurry Surface Impoundment
WMU #11

sleeve
empty
3/10/92
SAB

FMC Corporation

Phosphorus Chemicals Division

RCRA Part B Permit Application

March 1, 1991

Pocatello

Submitted to EPA Region X

Volume 1

Sections A – C

Copy 2

FMC Corporation
Elemental Phosphorus Manufacturing Plant
RCRA Part B Permit Application

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B Facility Description

Section B

FACILITY DESCRIPTION

B.1 GENERAL DESCRIPTION [270.14(b)(1)]

The FMC facility near Pocatello, Idaho (EPA ID #IDD070929518), produces elemental phosphorus from phosphorus shale. The elemental phosphorus is shipped in rail cars to five FMC burning plants. At the burning plants, the phosphorus is processed for end-product use in detergents, beverages, foods, synthetic lubricants, and pesticides.

The site is approximately three miles northwest of Pocatello, Idaho, in Township 6 South, Range 33 East (USGS topographic map, 1971) where it occupies portions of Sections 12 through 14 on the Fort Hall Indian Reservation. The easternmost portion of the site, located off the reservation, is in Township 6 South, Range 34 East, Sections 7 and 18. The facility lies approximately one mile southwest of the Portneuf River, a tributary of the Snake River.

A Union Pacific Railroad right-of-way parallels the northern property line of the facility in the western portion of the site and lies within property boundaries in the eastern operations area. Access to the facility is provided by Interstate Highway 86 and U.S. Highway 30.

Geologically, the site has been influenced by complex alluvial deposition, as well as volcanic and tectonic processes. Information on the stratigraphy of the site and geologic units present at the site is presented in Section E.2.

The regional climate is semi-arid, with an average annual precipitation of 12.3 inches. The annual net evaporation rate is 61 inches. Annual daily mean maximum temperature is 59.3°F. Annual daily mean minimum is 35.1°F. (National Weather Service, Pocatello, ID, 1990).

B.1.1 <u>Facility Description</u>

The FMC facility has been in continuous operation since its construction in 1949. The plant produces elemental phosphorus from rock mined regionally from the Phosphoria Formation. Raw ore is formed into briquets, hardened, mixed with silica and coke, and fed into electric arc furnaces. The elemental phosphorus is given off in a gaseous form which is condensed to a liquid, stored in tanks, and loaded into rail cars for shipment. Because of the unique properties of phosphorus, waste streams generated during the process must be handled with special care in order to protect the health of the work force.

The plant is physically organized around three major components. The administration complex consists of the main office building, technical support (laboratory) building, change house, lunchroom, and data processing. The Burden business, which handles the raw ore until it is mixed into the burden furnace feed, consists of the car dumper, stacker/reclaimer, and screening, crushing, briquetting, and calcining areas. The Phos business handles phosphorus production which takes place in the proportioning building, furnace building, and phosphorus loading dock (referred to as the phos dock). Support structures include mobile shops, power substations, maintenance buildings, and boiler plants.

Elemental phosphorus must be handled in an oxygen-depleted environment to prevent oxidation. Industry practice is to handle elemental phosphorus products and waste in an aqueous solution to prevent exposure to ambient air. This practice results in numerous surface impoundments containing differing quantities of elemental phosphorus residue. At the FMC facility there are seven such active units which are subject to hazardous waste regulation.

B.1.2 Process Operations

Process operations at the FMC site include: ore handling, furnace feed preparation, furnace operation, and byproduct handling.

Ore Handling and Preparation

Shale ore containing phosphorus arrives from J.R. Simplot's Gay Mine to FMC via rail car during the summer and is stored in a shale pile for processing. Because shale cannot be shipped during the winter months, a stockpile is built up over the summer from which to work during the winter. The shale is blended, reclaimed, screened, crushed, and sorted to provide a consistent size for forming into briquets. The annual plant shale use is approximately 1.5 million tons.

The briquetting process uses continuous roll presses to form the shale into briquets the size of charcoal briquets. These briquets then pass through the calciners where they are heated to a temperature of 1,600 to 2,300 °F in order to drive off the moisture and organic materials. This process results in heat-hardened nodules which are used as furnace feed material.

The plant has two continuous-grate calciners that operate in parallel. The soft briquets are placed on moving grates and carried through the calcining zone, the cooling zone, and then either stockpiled as nodules or conveyed to bins in the proportioning building. Fuel for the calcining zone is primarily carbon monoxide gas which is a byproduct of the furnace operation. Natural gas is used as a backup source of fuel. The cooling zone uses ambient air.

Each calciner has two wet scrubbers in parallel to provide particulate removal from the calciner offgas stream. Secondary scrubbers, to be located downstream of each of the existing scrubbers, are currently being designed and will further reduce air emissions of particulate and naturally occurring radionuclide material. These will also be wet scrubbers and will use Hydro-sonic® tandem nozzle scrubbers and cyclone separators. The blowdown liquid of the calciner scrubbers (500 gallons per minute from the first set of scrubbers and 200 gallons per minute from the second set of scrubbers) is treated for pH in the waste water treatment unit and sent to a surface impoundment (pond 1C, 3C, or 4C) for settling and ultimate recycle for use in the wet scrubbers. Pond 2C is a surge pond used to recycle water back to the scrubbers. The calciner scrubber blowdown is a beneficiation waste presently exempted from Subtitle C regulation. Yes?

The proportioning process blends the calcined briquets with silica and coke in the proper proportions to form the furnace feed. Annual quantities of silica and coke utilized are up to 100,000 tons and 180,000 tons, respectively. Each furnace may have a differently proportioned feed called the burden. The furnace feed is then conveyed to the burden level (the top entry to the feed bins) of the furnace building.

Furnace Operation

The furnace operation is considered the central processing step for the production of elemental phosphorus. The calcined briquets, silica, and coke are introduced into the four electric arc furnaces by gravity feed from the furnace feed bins located above the furnaces. Each furnace is equipped with three carbon electrodes through which power is fed to the furnaces resulting in a reaction zone with temperatures ranging from 2,300 to 2,700 °C.

The furnace reaction yields elemental phosphorus, carbon monoxide, calcium silicate (slag), and ferrophosphorus (ferrophos). The phosphorus exits the furnace in a gaseous form along with the carbon monoxide. These furnace gases are cleaned of entrained dust in a two-stage electrostatic precipitator process and then condensed in a water spray condenser to recover the elemental phosphorus. The molten phosphorus is collected in a sump below ground and processed at the phos dock. Current annual production of phosphorus is about 240 million pounds. The carbon monoxide gas is sent through a secondary condenser for maximum recovery of elemental phosphorus before being sent to the calciner for use as fuel. The precipitator dust is slurried with clarified phossy water and pumped to the precipitator slurry interim storage pond (8E) and ultimately to the precipitator slurry drying pond (9E). The excess process water used in the condensers is sent to the phos dock for phosphorus recovery processing and reuse, and then out to the Phase IV ponds where it is clarified and recycled.

The molten material that remains in the furnace as part of this phosphorus production process consists of calcium silicate slag and ferrophos, which is a phosphorus and iron alloy. Both the slag and ferrophos are tapped from each furnace several times per day through separate tap holes which allow the molten material to flow out of the furnace and to be collected separately. The tapping process is performed in a hood-type arrangement to allow for collection of the fumes generated as part of the tapping process. These fumes first pass through a Medusa wet venturi action scrubber and then Andersen filter dry scrubbers. The liquid from the Medusa and Andersen scrubbers is ? sent to a waste water treatment unit where it undergoes lime treatment to adjust the pH to 4.7 or higher before it is sent to the calciner ponds where it is clarified and recycled back to the calciner scrubbers. Used Andersen filter * media is considered hazardous waste and is shipped off-site for proper disposal.

The elemental phosphorus that is condensed to a liquid state is then stored in tanks in the phos dock area where it is loaded into rail cars for shipment or put into underground tanks for long-term storage. The phosphorus must be stored with a water cover to prevent the oxidation of the phosphorus upon exposure to air. Residual sludge that builds up at the phos dock is cleaned to a purer form and re-injected into the furnace.

Byproduct Handling

The main byproduct streams generated at FMC are carbon monoxide, slag, and ferrophos.

Carbon monoxide is produced in the chemical reaction that takes place in the furnace, and passes through the secondary condenser for further phosphorus recovery. It is then burned in the calciner for fuel or flared.

The molten slag runs into the slag pit where it cools and is continuously loaded into haul trucks that move it to the slag pile.

The ferrophos is collected in sand molds and cooled in the furnace building, stored on-site, and sold.

B.1.3 Waste Streams

The various regulated waste streams at the FMC facility are discussed below.

Water

Water has several uses at the facility. Many operations use fresh water as non-contact cooling water. This water does not come in contact with any contaminants but, rather, is used for activities such as secondary cooling loops, furnace cooling, and calciner water beams. This non-contact cooling water (approximately 1,500 gallons per minute) is either evaporated into the air, used as irrigation water, or is directly discharged into the Portneuf River via the industrial waste water (IWW) cooling basin. Discharge is allowed under NPDES permit #ID-000022-1.

Some fresh or recycled cooling water (IWW) is used for operations such as phosphorus storage (phosphorus must be covered with water to prevent oxidation), pump packing purges, and slag quenching. As a result of its contact with phosphorus, this waste water contains suspended and dissolved phosphorus, and other dissolved solids (known collectively as phossy wastes) and is called phossy water. The phossy water is pumped to the Phase IV ponds - 11S, 12S, 13S, and 14S - for clarification. This series of four single-lined ponds clarifies the liquid through sedimentation. The water passes through at least two ponds allowing the suspended solids to settle out. Then the clarified water is routed back to the plant to serve as makeup water for plant process use to minimize freshwater contact with phosphorus.

→ water leaks or well contained

Solids that settle out of the water contain varying amounts of phosphorus. The phosphorus can be reclaimed through a recovery process. Phossy water as a waste stream is not considered, nor has it tested, hazardous except as a waste water liquor in pond 15S, which failed the TCLP test for cadmium. Based on knowledge of the waste streams, it is suspected that pond 8S would also fail the TCLP test for cadmium. Phossy wastes, initially thought to be characteristically hazardous due to toxicity, have not proven to be so in EP toxicity and TCLP tests. The phossy wastes are chemically reactive due to their phosphorus content, but do not exhibit the reactivity characteristic as defined in 40 CFR 261.23.

☆ why list SOU SI on Part A for "phossy wastes"

Scrubber Blowdown

As mentioned in the description of furnace operations, Medusa scrubbers clean fumes off of the furnace tapping operations. The Andersen scrubber on the phos dock cleans the fumes off the dock operations of phosphorus loading. Both scrubber systems produce blowdown that exhibits the corrosivity hazardous characteristic and the toxicity characteristic for cadmium. These two blowdown streams are managed differently; the Medusa scrubber blowdown is treated in the waste water treatment unit, and the phos dock scrubber blowdown is sent to a sump and then out to the Phase IV ponds for clarification.

Precipitator Dust

Precipitator dust (furnace off-gas solids) from the furnace precipitator operations is slurried and pumped to pond 8E where the suspended solids settle out. The solids are distributed mechanically and then pumped to pond 9E during the portion of the year that the pond is receiving slurry, where they are allowed to dry. The dried solids are removed annually and stored on-site in a hazardous waste pile (area 9S). The precipitator dust fails TCLP tests for cadmium.

Andersen Filter Media

Andersen filter media is used in scrubbers in the furnace tapping and phosphorus loading dock fume treatment, and in the pond 8S recovery process. The used filter media is considered hazardous waste and is being sent to a permitted hazardous waste facility in Utah for disposal. The filter media is stored at the site until a full shipment can be sent to the disposal site. No long-term storage or on-site disposal of filter media is currently taking place. However, prior to removal of the Bevill exemption for these wastes, used Andersen filter media was disposed of in a separate cell of an on-site landfill.

Other Streams

Other waste streams at the FMC facility consist of small quantities of waste paint, degreasing, and laboratory solvents. These wastes are shipped off-site for recycling or disposal. Occasionally, lab packs - small quantities of various waste laboratory chemicals - are also shipped off-site for disposal.

Air emissions from the FMC facility consist mainly of gaseous releases from the calciner and furnace processes. There may be other "fugitive emissions" or emissions associated with the material storage and piles, but they are regulated under a State of Idaho Air Pollution Source Permit (13-1260-0005).

B.1.4 Waste Management Units

The FMC facility has designated certain areas as waste management units (WMUs) for ease of identification and regulation. Following are brief descriptions of the hazardous waste management units included in this application. More detailed information on these units can be found in Section D, Process Information.

Drum Storage Area - WMU #1

The drum storage area is an area approximately 11 ft x 15 ft located south of the technical support building. It is constructed of a concrete slab on grade with protective side curbing, and is designed to store 26 55-gallon drums (1,430 gallons) of waste liquid solvents which are listed as hazardous wastes. The waste solvents are of three types: a) laboratory solvents, which may be a mixture of toluene, xylene, benzene, and contaminated with elemental phosphorus; b) paint solvents, which may be a mixture of xylene, toluene, and methyl ethyl ketone; and c) degreasing solvents, which may be a mixture of methylene chloride, 1,1,1-trichloroethane, and contaminated with dirt, oil, and water. The unit is inspected weekly.

Andersen Filter Media Storage Area - WMU #2

The temporary storage area for used Andersen filter media is a paved surface marked off by caution tape and located approximately 150 feet southwest of the furnace building. The area contains two 20-cubic-yard ragtop roll-off dumpsters that hold and transport used Andersen filter media. The ragtops on the dumpsters prevent precipitation from entering the dumpsters. The used filter media is composed of 95 percent glass fiber filters and a 5 percent combination of phosphoric acid and dirt. The used filter media is characteristically hazardous because of its cadmium and arsenic content.

A permanent storage area will be constructed in approximately the same location, to include an asphalt pad with a berm for secondary containment of the waste and run-on/run-off containment. The temporary storage area and the permanent storage area will be inspected daily.

Phossy Waste Surface Impoundment (Pond 15S) - WMU #3

Pond 15S covers an area of 9.4 acres and holds 140 acre-feet of liquid and phossy wastes. The pond is double lined with 30 mil polyvinyl chloride and includes a leachate detection system. It receives phossy waste from dredged ponds and process operations, decant water from precipitator slurry pond 9E (WMU #9), and waste water liquor from the pond 8S recovery process (WMU #4). The water in 15S is hazardous because of the decant water from 9E and exhibits the toxicity characteristic for cadmium. In addition to the leak detection system, there are four leak detection wells around the unit. Freeboard is inspected and measured daily, and the unit is inspected weekly.

Pond 8S Recovery Process - WMU #4

Pond 8S recovery process treats phossy wastes from pond 8S (WMU #7) for the recovery of elemental phosphorus. It is a treatment system that is designed to process 500 gallons per minute of waste water and sediments composed of dirt and elemental phosphorus. The residue is pumped to the phossy waste surface impoundment (pond 15S). The process cannot be run during the winter months due to the weather. The process is contained by a curbed concrete pad and is inspected weekly during operation.

Slag Pit Waste Water Collection Sump - WMU #5

The slag pit waste water collection sump covers an area of approximately 100 square feet in the southeast corner of the slag pit. The sump is unlined and below grade. It receives phossy water and solids from furnace building floor washdowns, which flow through the slag pit, and can receive phossy water from the phos dock. The furnace building floor washdown, which was sampled in the tiger pits (small temporary dikes in the slag pit) can fail hazardous characteristics for cadmium. (It should be noted that as of March 1, 1991, tiger pits will no longer be used.) The liquid and settled solids are pumped to the Phase IV ponds (WMU #8). The sump is inspected daily to ensure that minimal amounts of water are entering it. Planning is now underway for a tank to replace the sump to collect phossy waste water from the furnace building and the phos dock.

Precipitator Dust Storage Pile (Area 9S) - WMU #6

The storage pile for dried precipitator dust covers approximately 3.0 acres and is contained within an unlined, excavated area to minimize wind erosion. The dust consists of fine particulate matter exhibiting the hazardous toxicity characteristic due to cadmium. The pile is below grade and is inspected weekly.

Phossy Waste Surface Impoundment (Pond 8S) - WMU #7

Pond 8S is an unlined pond containing phossy waste from previous operations. Phossy waste has not been sent to 8S since 1981. The pond covers 3.2 acres and contains approximately 70 acre-feet of phossy waste containing dirt, water, and a recoverable amount of elemental phosphorus. Water in ponds 15S and 8S can be sent in either direction for level control. The pond is inspected daily for general condition and adequate water freeboard level. The material in this pond is pumped out and treated in pond 8S recovery process (WMU #4).

Phossy Water Clarifier Surface Impoundments (11S, 12S, 13S, 14S) - WMU #8

The four phossy water clarifier ponds (also called the Phase IV ponds) are positioned in series so that water can pass through at least two in succession. Ponds 11S, 12S, and 13S are each approximately 2 acres in area and 20 acre-feet in volume. Pond 14S is about 3 acres in area and 33 acre-feet in volume. The ponds are single-lined with 30 mil polyvinyl chloride. Ponds 11S, 12S, and 13S receive phossy water from various plant operations and from pond 15S for level control. The four ponds are being permitted because they may receive hazardous waste streams (water from the slag pit sump, and 15S). The phossy water carries phossy wastes in the form of suspended phosphorus and other solids. The solids and phosphorus settle out in the ponds and are dredged to pond 15S. Water passes through the ponds by gravity separation, and the clarified water from pond 14S is recycled back for use in the plant. In addition to receiving phossy water, Pond 13S receives some phosphorus-contaminated solids.

Precipitator Slurry Drying Surface Impoundment (Pond 9E) - WMU #9

Pond 9E is used for drying the precipitator slurry that is dredged from 8E (WMU #11). The 12.9-acre pond is double-lined and holds 73 acre-feet of water and dredged solids from 8E. Once a year, inflow to pond 9E is stopped, the standing water is decanted into pond 15S (WMU #3), and the remaining solids are turned, air-dried, and excavated to area 9S (WMU #6). As mentioned above, precipitator slurry exhibits the toxicity characteristic due to cadmium.

Phossy Waste Surface Impoundment (Pond 16S) - WMU #10

Plans are currently underway to construct a new disposal pond, 16S, as an alternative disposal pond to pond 15S. This new pond will be constructed to RCRA requirements for a waste disposal surface impoundment. The pond (approximately 10.2 acres) will be slightly larger than pond 15S and hold approximately 150 acre-feet of liquid. It will be located west of pond 15S. Because it will manage the same wastes as pond 15S, it is being considered a hazardous waste management unit for the same reasons.

Precipitator Slurry Storage Surface Impoundment (Pond 8E) - WMU #11

The dust that comes off the electrostatic precipitators is slurried and pumped to pond 8E. The pond is a 2.8-acre surface impoundment that is double-lined with 30 mil polyvinyl chloride and holds approximately 27 acre-feet of precipitator slurry with suspended solids. In the pond, the suspended solids settle out, are distributed mechanically throughout the pond, and are dredged periodically to pond 9E. These solids fail the toxicity characteristic for cadmium.

Scrubber Blowdown Waste Water Treatment Unit - WMU #12

WMU #12 is a treatment system used to treat Medusa scrubber blowdown and calciner scrubber blowdown (a Bevill-exempt waste stream) for cadmium. A reactor tank collects the Medusa scrubber blowdown and other Bevill-exempt streams. Slaked lime is added to the reactor tank, rendering the cadmium insoluble. The waste stream discharged from the tank then no longer exhibits the hazardous characteristic. Supporting documentation is presented in Appendix D-7.

? ☆ Hznt ? ww treatment exemption

3470 II SW
(SPRINGFIELD)

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

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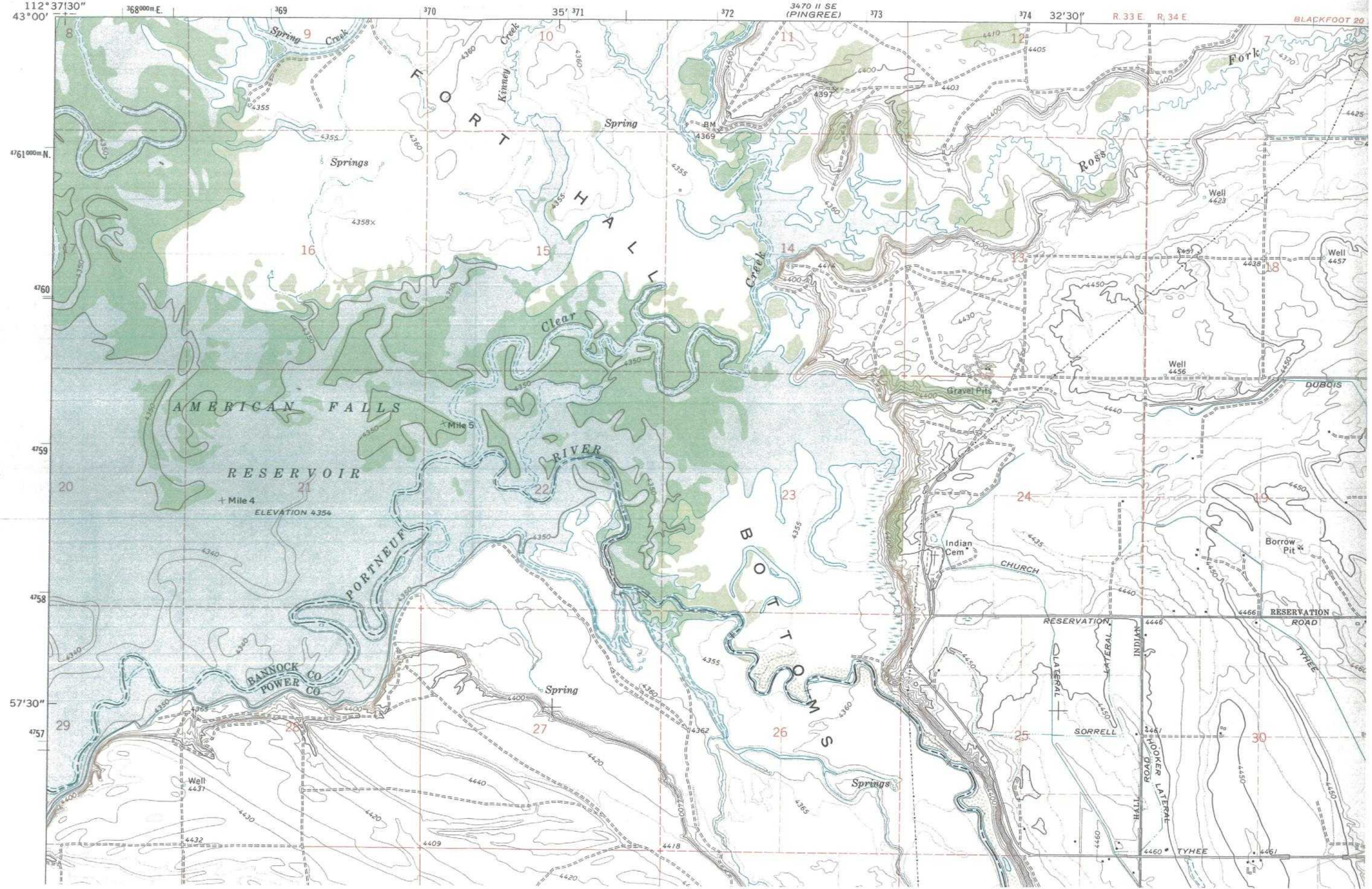
7.5 MI



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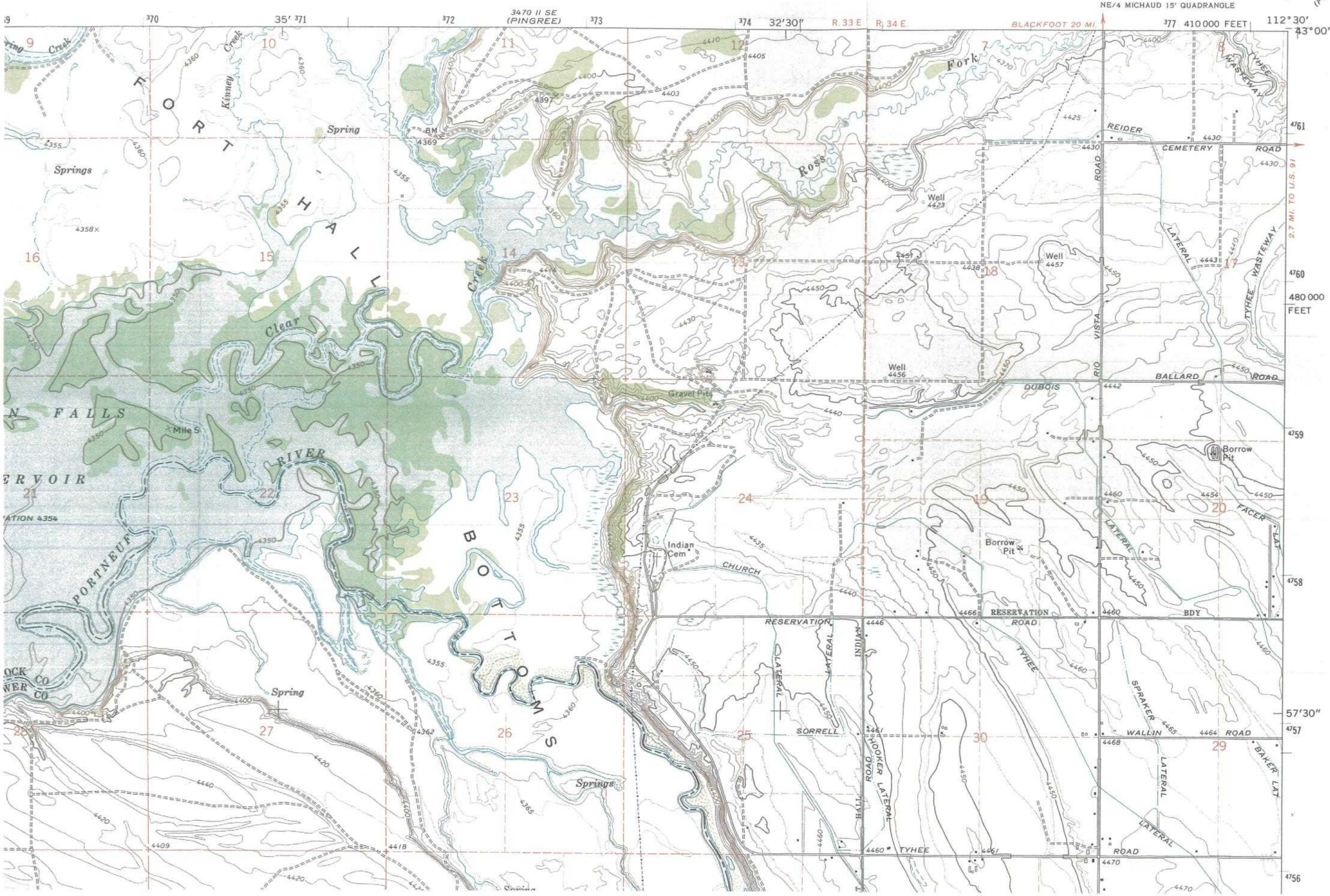
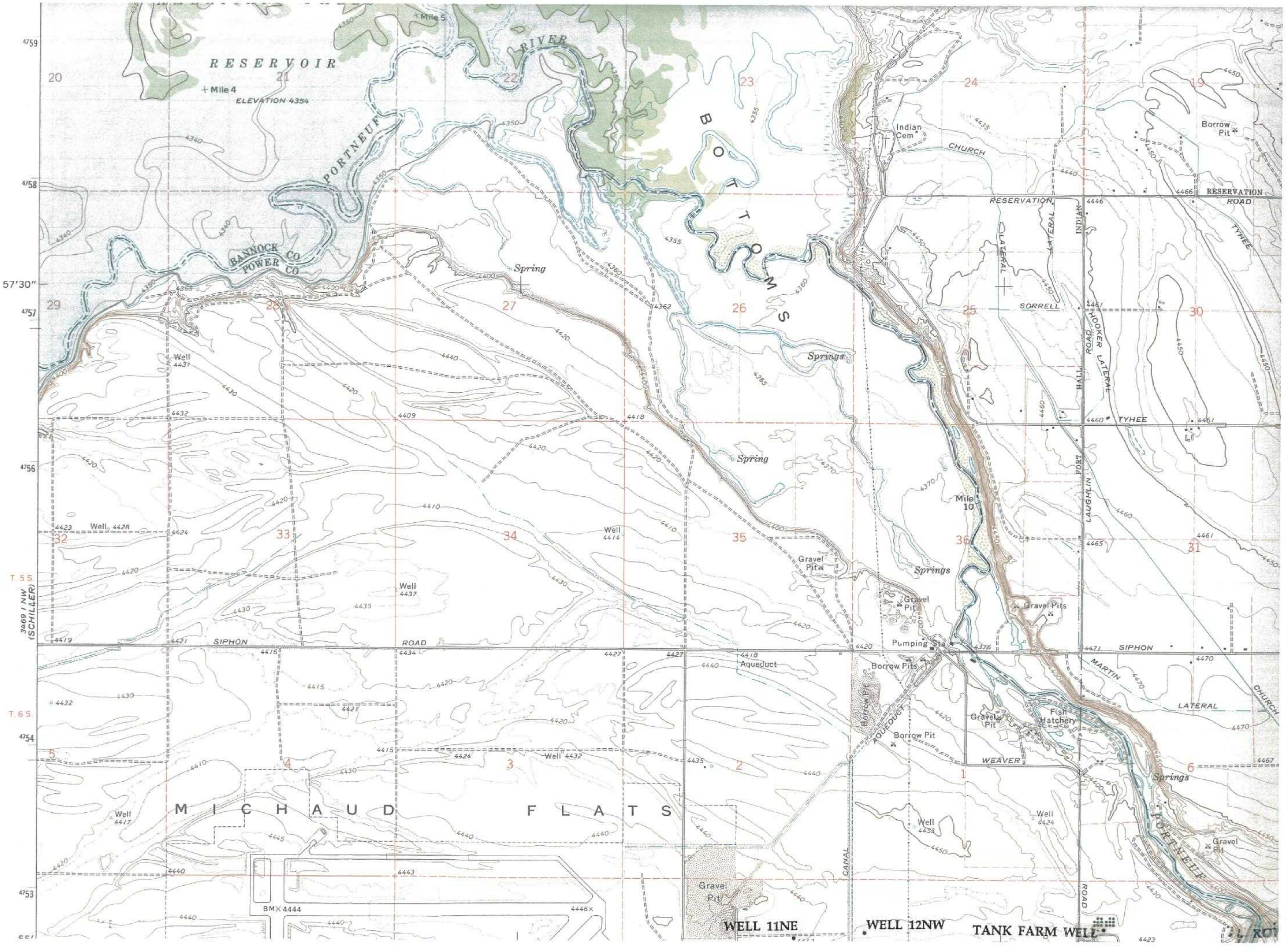
MICHAUD QUADRANGLE
IDAHO
7.5 MINUTE SERIES (TOPOGRAPHIC)
NE/4 MICHAUD 15' QUADRANGLE





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ELEVATION 4354
PORTNEUF
RIVER
BANNOCK POWER CO
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Springs
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CHURCH
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SORRELL
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HALL
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HOOKER LATERAL
TYHEE
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WELL 12NW
TANK FARM WELL

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Borrow Pit
FACER LAT
SORRELL
WALLIN ROAD
BAKER LAT
HALL ROAD
HOOKER LATERAL
FORT LAUGHLIN
TYHEE ROAD
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Mile 5
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Well 4437
Gravel Pits
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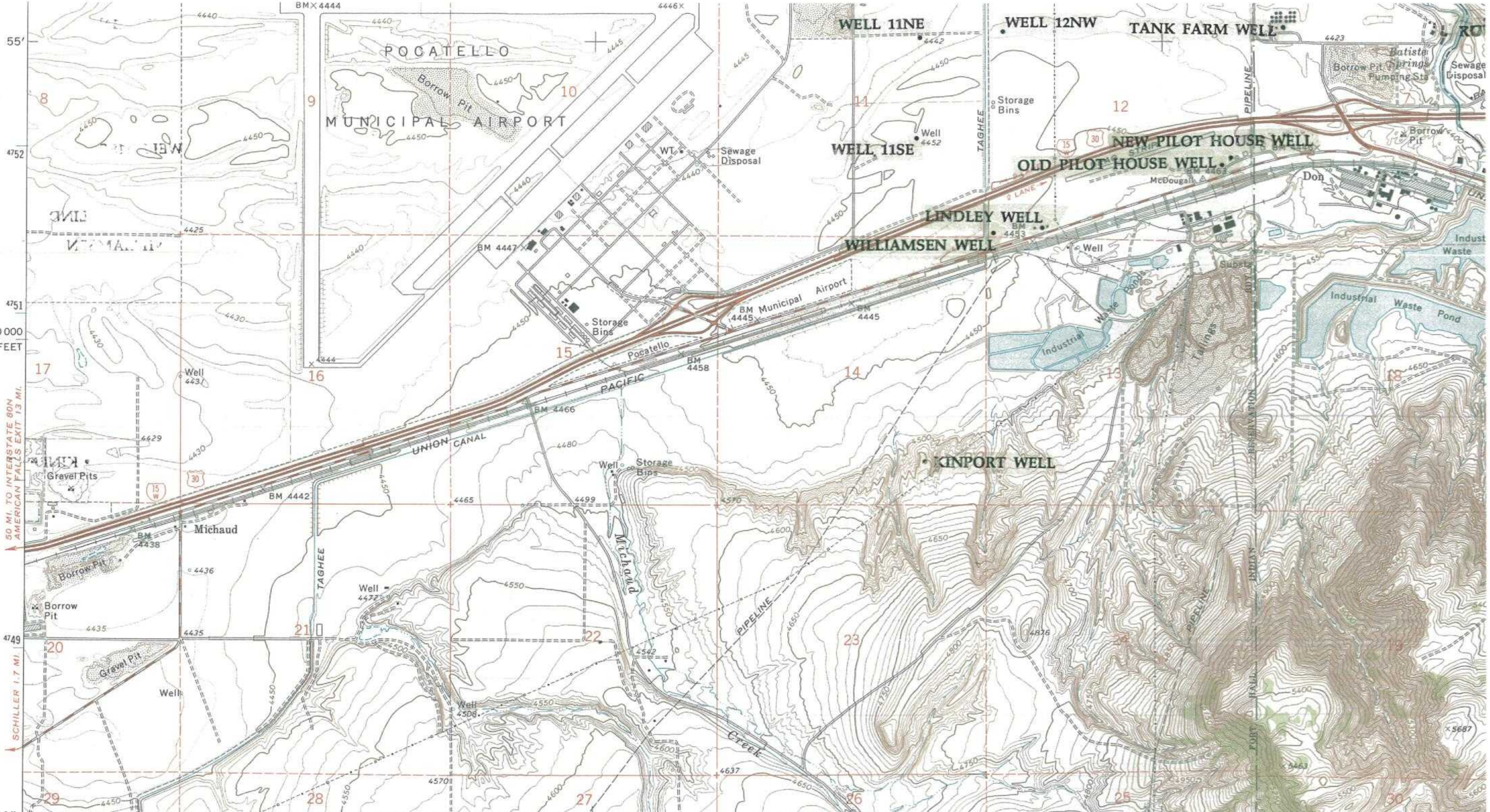
WELL 12NW
TANK FARM WELL
ROWLANDS WELL



Mapped, edited, and published by the Geological Survey

Control by USGS and USC&GS

Topography by photogrammetric methods from aerial photographs taken 1969. Field checked 1971
Underwater contours by U. S. Bureau of Reclamation

Projection and 10,000-foot grid ticks: Idaho coordinate system, east zone (transverse Mercator)
1000-meter Universal Transverse Mercator grid ticks, zone 12, shown in blue. 1927 North American datum

To place on the predicted North American Datum 1983 move the projection lines 12 meters north and 67 meters east as shown by dashed corner ticks

Fine red dashed lines indicate selected fence lines

GN MN
1°04' 19 MILS
17° 302 MILS

UTM GRID AND 1971 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

SCALE 1:24 000

1 ½ 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 .5 0 1 KILOMETER

CONTOUR INTERVAL 10 FEET
DOTTED LINES REPRESENT 5-FOOT CONTOURS
NATIONAL GEODETIC VERTICAL DATUM OF 1929

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U. S. GEOLOGICAL SURVEY, DENVER, COLORADO 80225, OR RESTON, VIRGINIA 22092
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

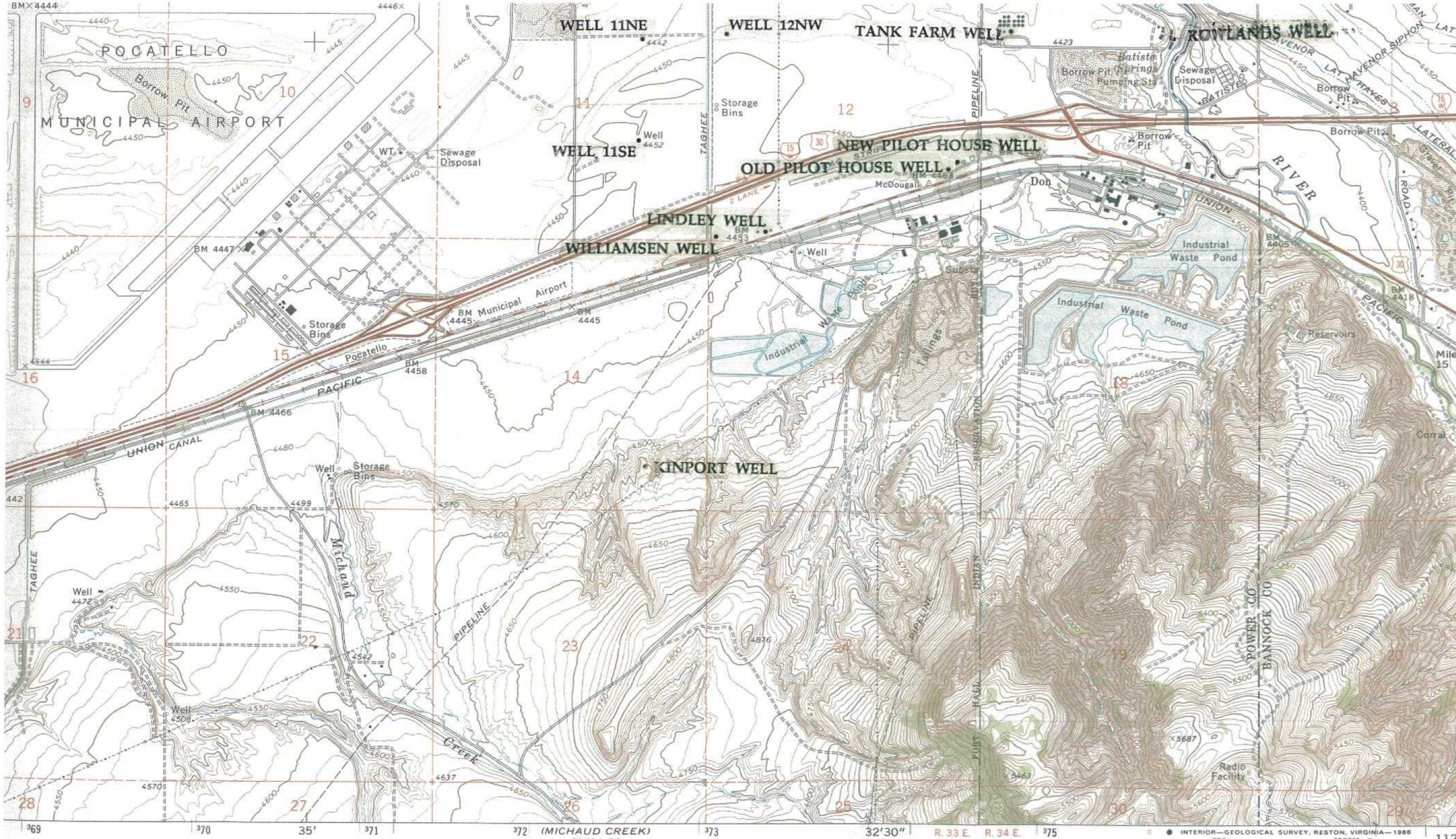
Primary highway, hard surface

Secondary highway hard surface

Interstate F

IDAHO
QUADRANGLE LOCATION

Map photoinspected 1974
No major culture or drainage changes observed



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GN MN
1°04′ 19 MILS
17° 302 MILS

UTM GRID AND 1971 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

(MICHAUD CREEK)
3469 I SE

SCALE 1:24 000

1 ½ 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 .5 0 1 KILOMETER

CONTOUR INTERVAL 10 FEET
DOTTED LINES REPRESENT 5-FOOT CONTOURS
NATIONAL GEODETIC VERTICAL DATUM OF 1929

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U. S. GEOLOGICAL SURVEY, DENVER, COLORADO 80225, OR RESTON, VIRGINIA 22092
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

IDAHO

QUADRANGLE LOCATION

Map photoinspected 1974
No major culture or drainage changes observed

INTERIOR—GEOLOGICAL SURVEY, RESTON, VIRGINIA—1966

ROAD CLASSIFICATION

Primary highway, hard surface
Light-duty road, hard or improved surface
Secondary highway, hard surface
Unimproved road
Interstate Route
U. S. Route
State Route

(POCATELLO SOUTH)
3569 IV SW

MICHAUD, IDAHO
NE/4 MICHAUD 15′ QUADRANGLE
42112-H5-TF-024

1971
PHOTOINSPECTED 1974
DMA 3469 I NE—SERIES V893

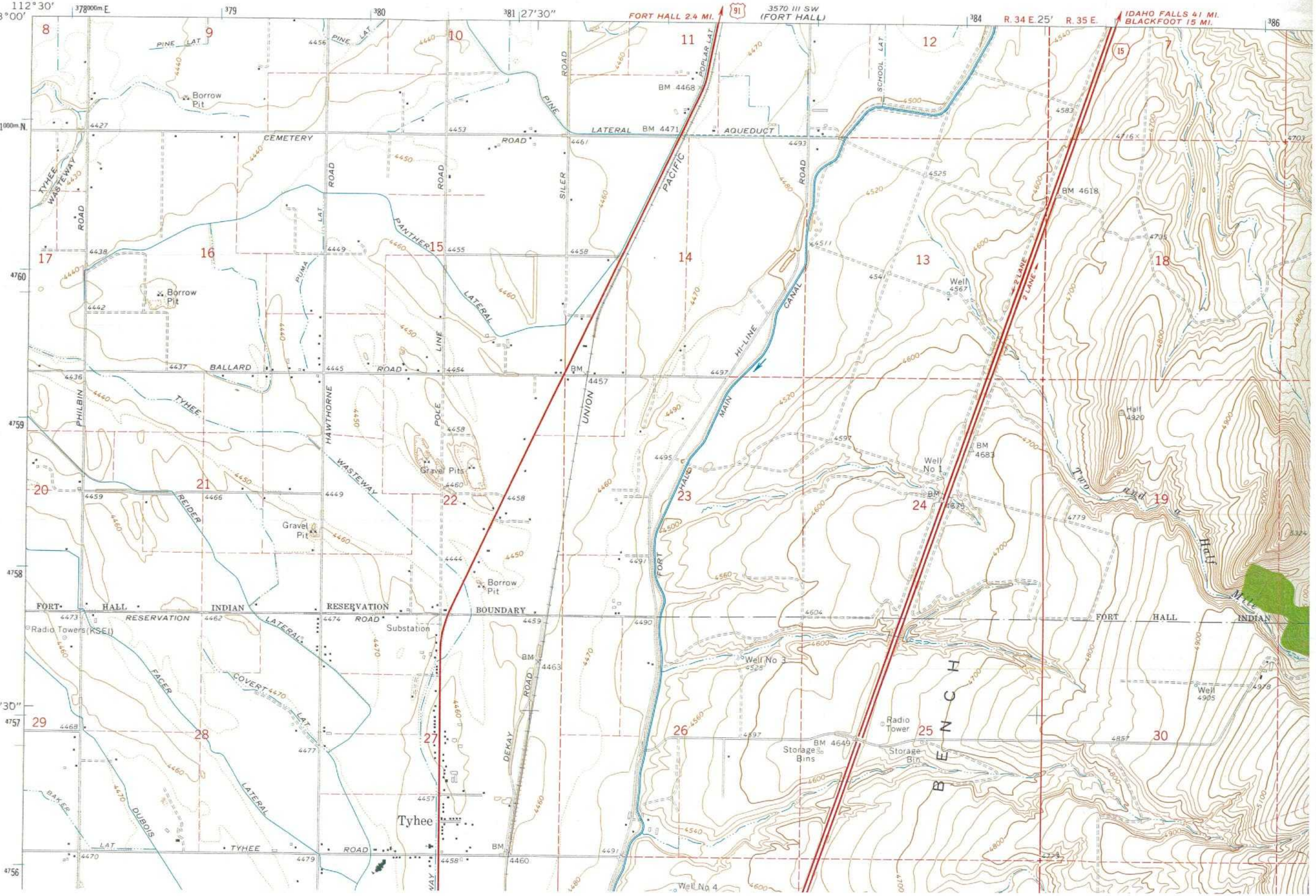
FIGURE B.2-2

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

3470 II SE
(PINGREE)

POCA

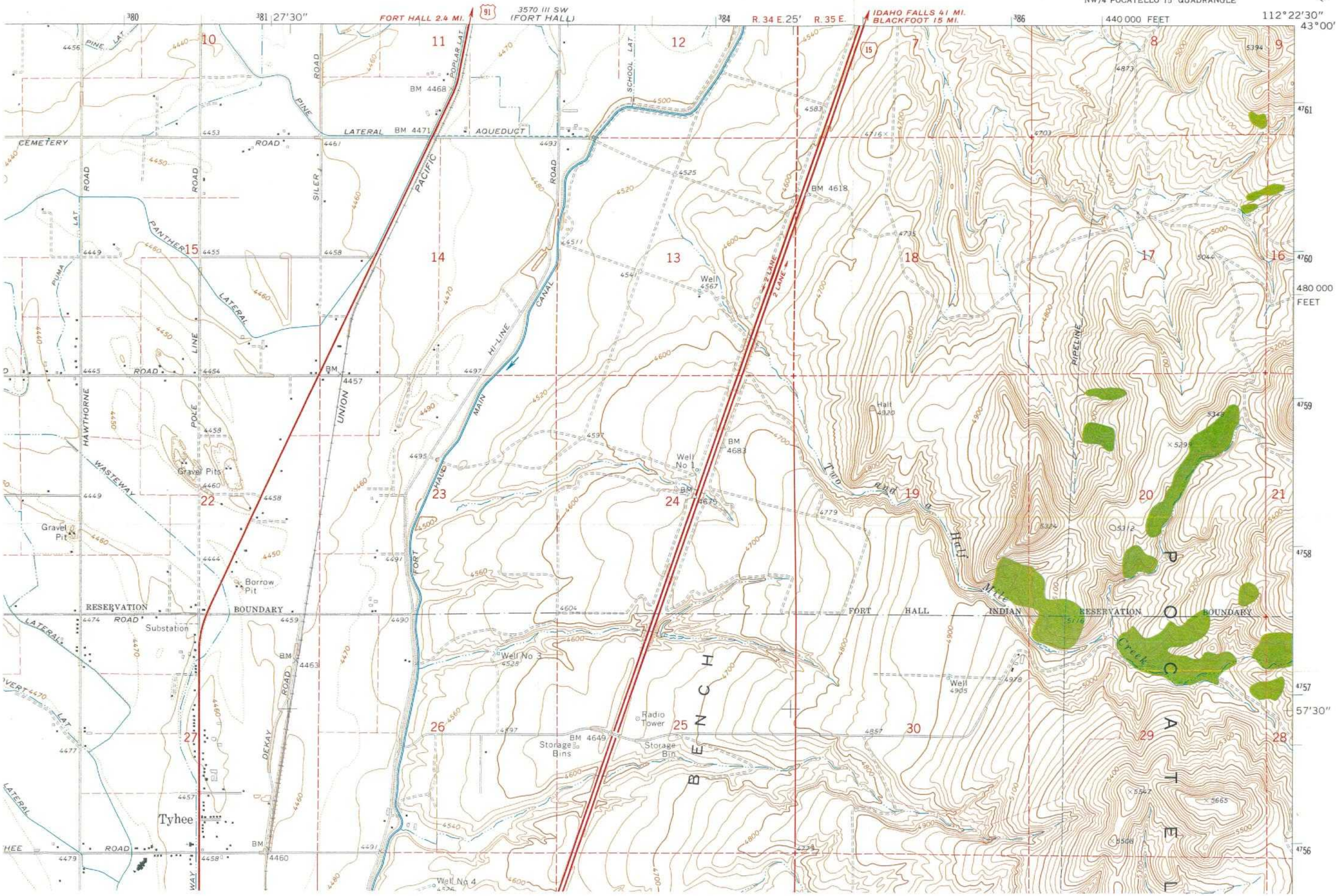
7.5

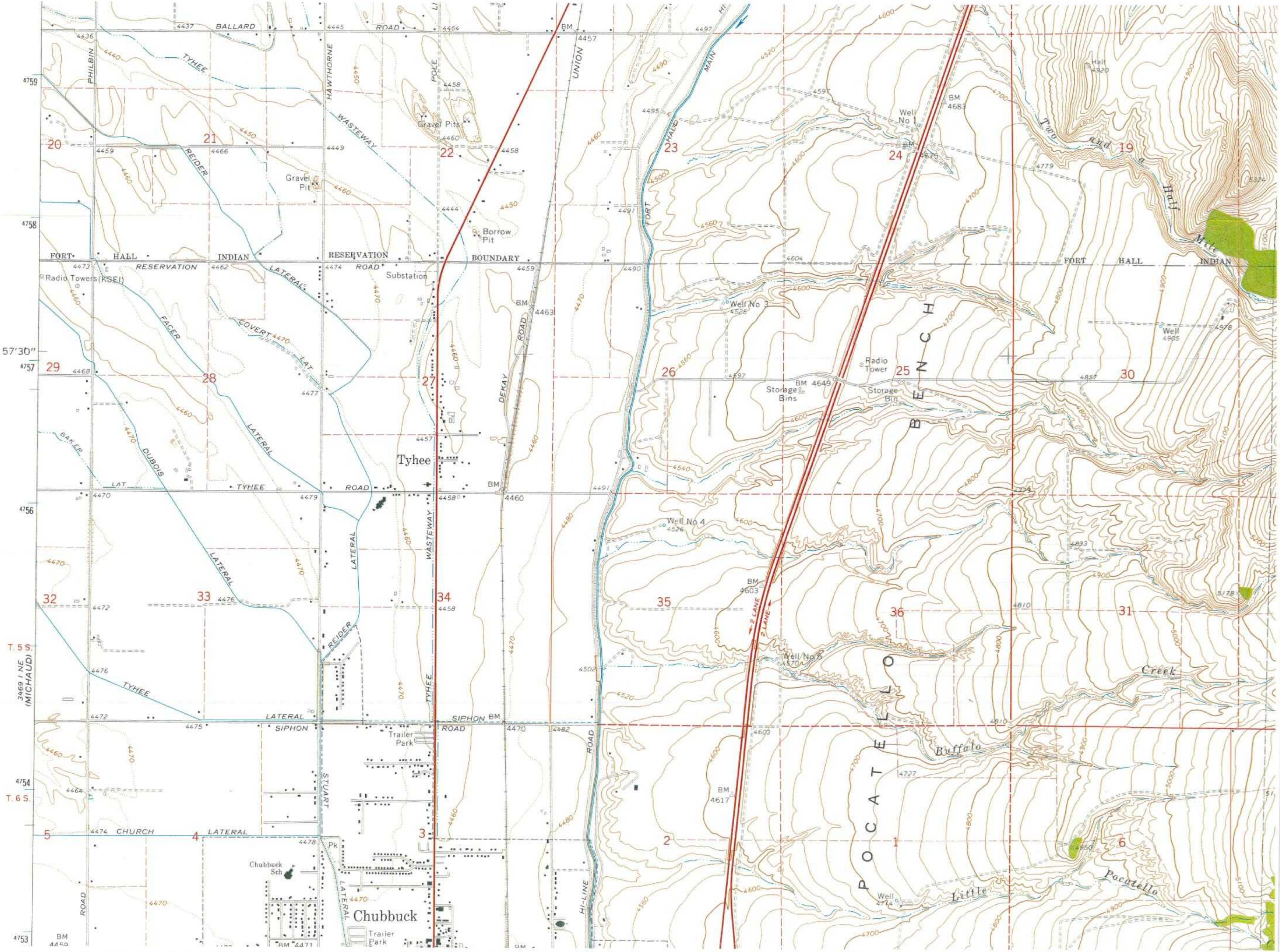


ERIOR

POCATELLO NORTH QUADRANGLE
IDAHO–BANNOCK CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)
NW/4 POCATELLO 15' QUADRANGLE

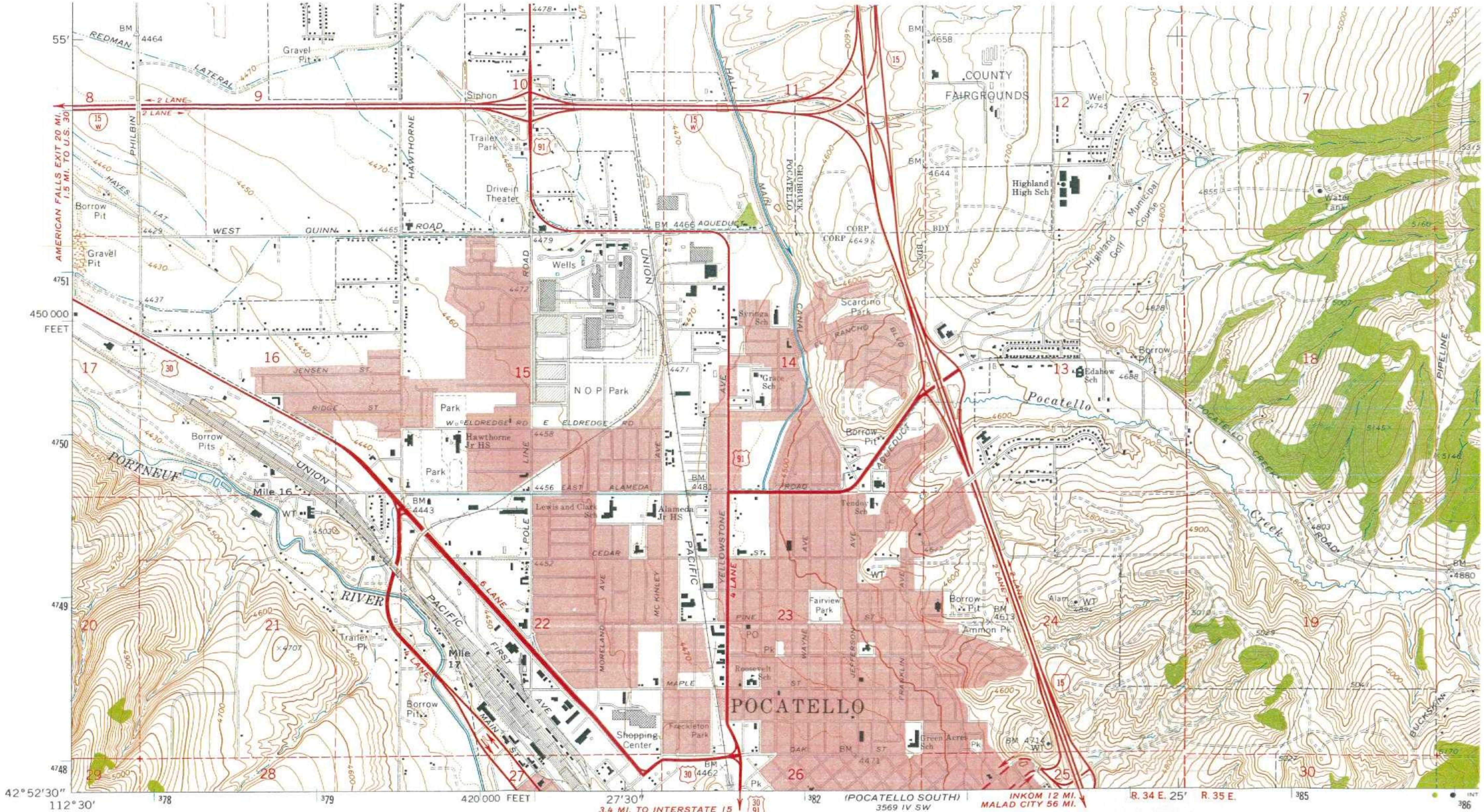
3570 III SE
(BUCKSKIN BASIN)





BALLARD ROAD
PHILBIN
TYHEE
HAWTHORNE
POLE
UNION
MAIN
HALL
FORT
WASTEWAY
Gravel Pits
Gravel Pit
Borrow Pit
REIDER
FORT HALL INDIAN RESERVATION BOUNDARY
RESERVATION ROAD
Radio Towers (KSEI)
Substation
LATERAL
FACER
COVERT LAT
DEKAY ROAD
Well No 1
Well No 3
Well No 4
Well No 5
Well
Half
Two and a Half Mile
FORT HALL INDIAN
BENCH
POCATELLO
Radio Tower
Storage Bins
Storage Bin
Tyhee
TYHEE ROAD
BAKER LAT
DUBOIS
Tyhee
SIPHON
Trailer Park
STUART
CHURCH LATERAL
Chubbuck Sch
Chubbuck
HI-LINE ROAD
Creek
Buffalo
Little Pocatello
2 LANE
T. 5 S.
T. 6 S.
3469 I NE (MICHAUD)
57'30"
4759
4758
4757
4756
4754
4753

ROAD
HAWTHORNE
POLE
UNION
MAIN
HALL
FORT
WASTEWAY
Gravel Pits
Gravel Pit
Borrow Pit
RESERVATION
BOUNDARY
ROAD
Substation
FORT HALL INDIAN RESERVATION BOUNDARY
Two and a Half Mile Creek
Hall
Well No 1
Well No 3
Well No 4
Well No 5
Well
Radio Tower
Storage Bins
Storage Bin
BENCH
POCATELLO
DEKAY ROAD
LATERAL
Tyhee
TYHEE
WASTEWAY
REIDER
SIPHON
LATERAL
Trailer Park
STUART
HI-LINE
ROAD
Chubbuck Sch
Chubbuck
Pk
Creek
Buffalo
Little Pocatello
Spring
2 LANE
22
23
24
19
20
21
27
26
25
30
29
28
34
35
36
31
32
33
3
2
1
6
5
4
57'30"
T. 5 S.
T. 6 S.
4759
4758
4757
4756
4754
4753
(MOONLIGHT MTN.)
3569 IV NE



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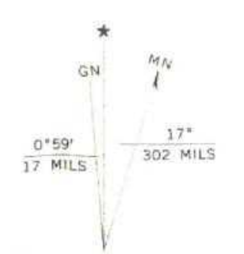
Control by USGS and USC&GS

Topography by photogrammetric methods from aerial photographs taken 1969. Field checked 1971

Projection and 10,000-foot grid ticks: Idaho coordinate system, east zone (transverse Mercator)
1000-meter Universal Transverse Mercator grid ticks, zone 12, shown in blue. 1927 North American datum

Red tint indicates areas in which only landmark buildings are shown

Fine red dashed lines indicate selected fence lines



UTM GRID AND 1971 MAGNETIC NORTH
DECLINATION AT CENTER OF SHEET

SCALE 1:24 000

CONTOUR INTERVAL 20 FEET
DOTTED LINES REPRESENT 10-FOOT CONTOURS
DATUM IS MEAN SEA LEVEL

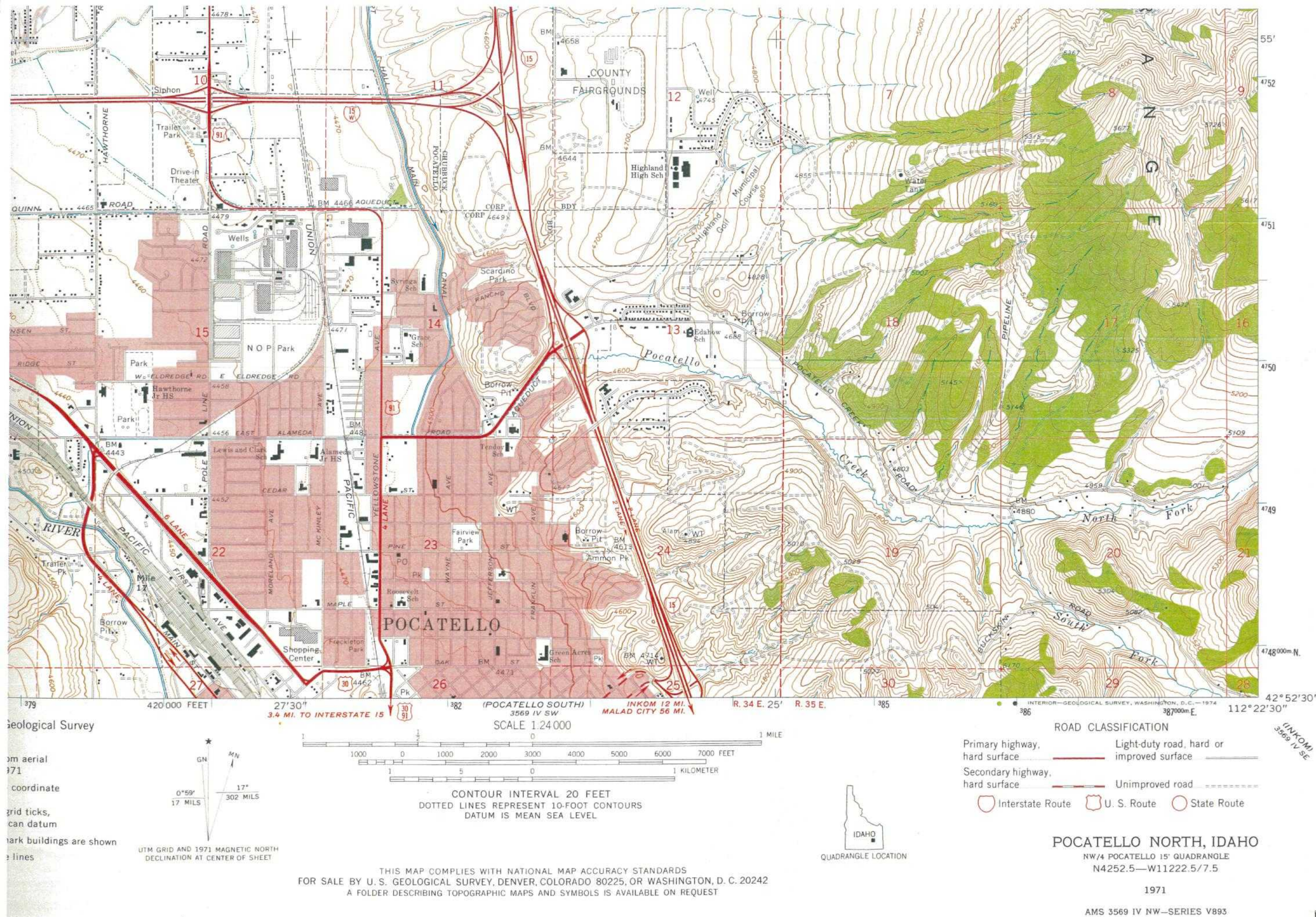
QUADRANGLE LOCATION

Primary highway, hard surface

Secondary highw[ay], hard surface

Interstat[e]

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U. S. GEOLOGICAL SURVEY, DENVER, COLORADO 80225, OR WASHINGTON, D. C. 20242
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST



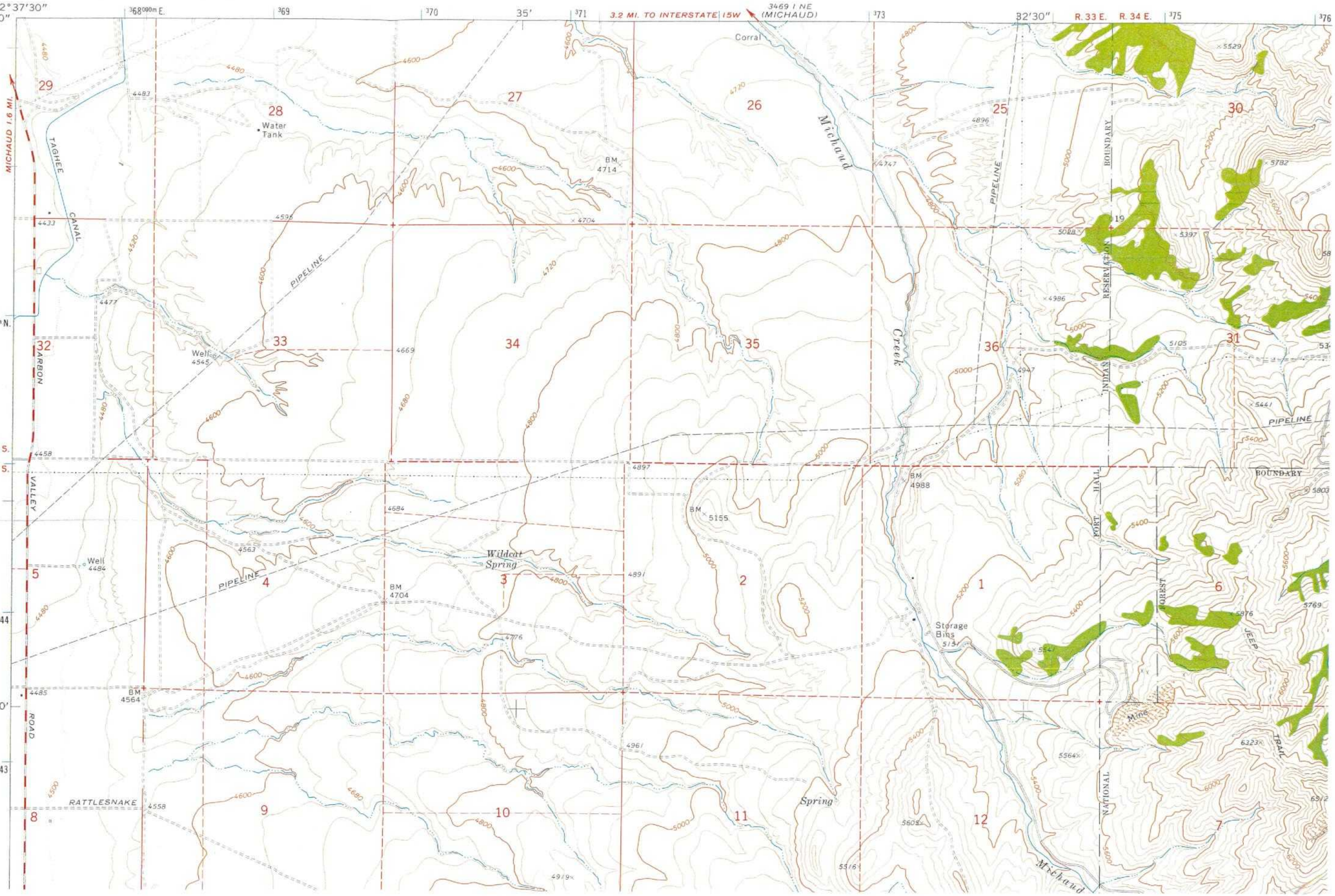
POCATELLO
COUNTY FAIRGROUNDS
Highland High Sch
Municipal Golf Course
NOP Park
Hawthorne Jr HS
Lewis and Clark Sch
Alameda Jr HS
Syringa Sch
Grace Sch
Scardino Park
Edahow Sch
Tendoy Sch
Fairview Park
Roosevelt Sch
Freckleton Park
Green Acres Sch
Ammon Pk
Shopping Center
Drive-in Theater
Trailer Park
Siphon
Water Tank
Borrow Pit
Pocatello Creek
North Fork
South Fork
RIVER
PORTNEUF
HAWTHORNE
QUINN ROAD
ELDREDGE RD
ALAMEDA
CEDAR
PINE
MAPLE
OAK
YELLOWSTONE AVE
PACIFIC
UNION
MAIN
CANAL
PIPELINE
AQUEDUCT
RANCHO BLVD
POCATELLO CREEK ROAD
BUCKSKIN
SOUTH FORK ROAD
Mile 17
3.4 MI. TO INTERSTATE 15
INKOM 12 MI.
MALAD CITY 56 MI.
(POCATELLO SOUTH)
3569 IV SW
R. 34 E. R. 35 E.
42°52'30"
112°22'30"
27'30"
420 000 FEET
INTERIOR—GEOLOGICAL SURVEY, WASHINGTON, D. C.—1974
(INKOM)
3569 IV SE
Geological Survey
SCALE 1:24 000
1 MILE
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 KILOMETER
CONTOUR INTERVAL 20 FEET
DOTTED LINES REPRESENT 10-FOOT CONTOURS
DATUM IS MEAN SEA LEVEL
GN
MN
0°59'
17 MILS
17°
302 MILS
UTM GRID AND 1971 MAGNETIC NORTH
DECLINATION AT CENTER OF SHEET
ROAD CLASSIFICATION
Primary highway, hard surface
Light-duty road, hard or improved surface
Secondary highway, hard surface
Unimproved road
Interstate Route
U. S. Route
State Route
IDAHO
QUADRANGLE LOCATION
THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U. S. GEOLOGICAL SURVEY, DENVER, COLORADO 80225, OR WASHINGTON, D. C. 20242
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST
POCATELLO NORTH, IDAHO
NW/4 POCATELLO 15' QUADRANGLE
N4252.5—W11222.5/7.5
1971
AMS 3569 IV NW—SERIES V893

FIGURE B.2-3

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

MICHA

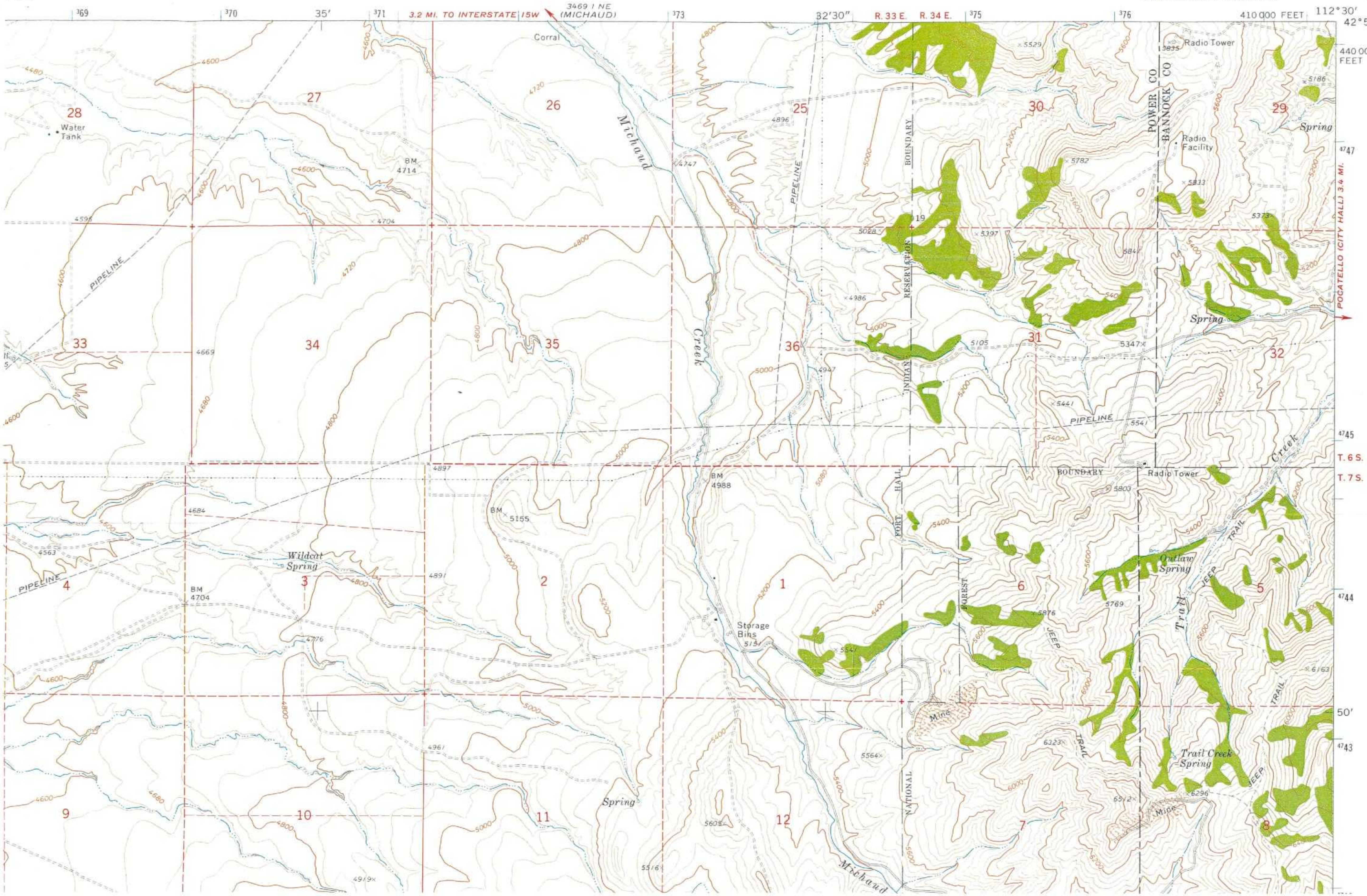
7.5 MI

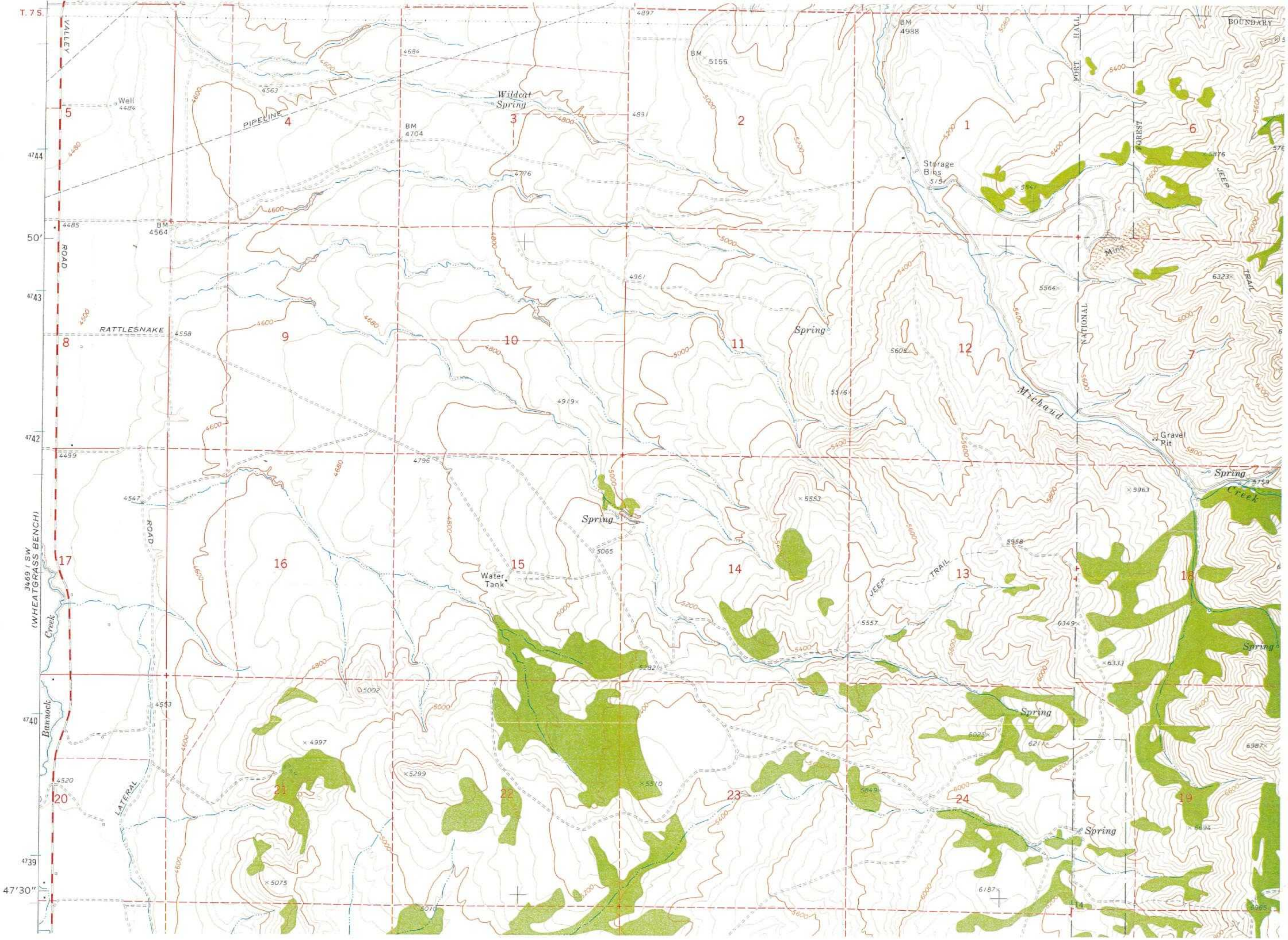


S
INTERIOR
VEY

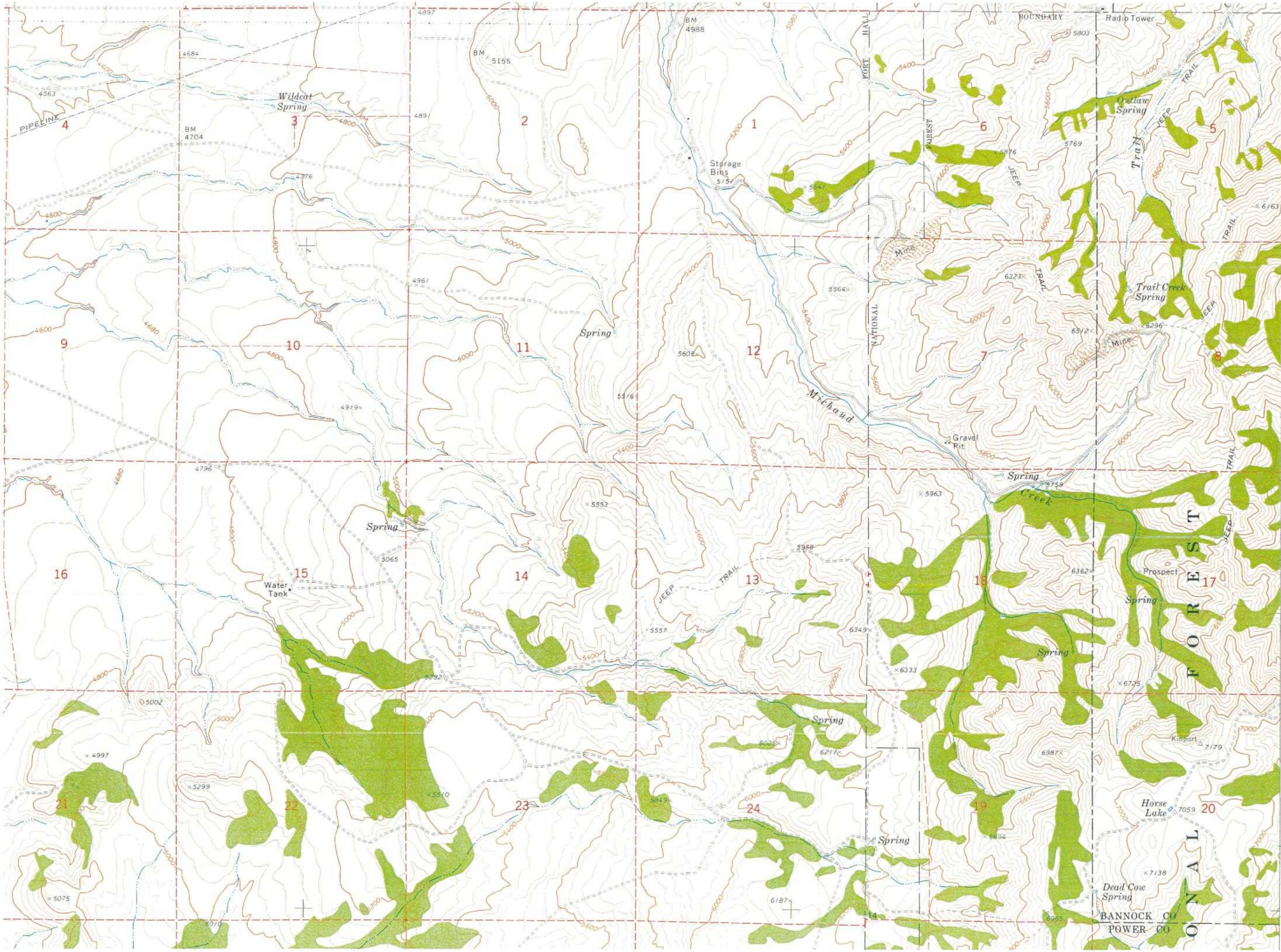
MICHAUD CREEK QUADRANGLE
IDAHO
7.5 MINUTE SERIES (TOPOGRAPHIC)
SE/4 MICHAUD 15' QUADRANGLE

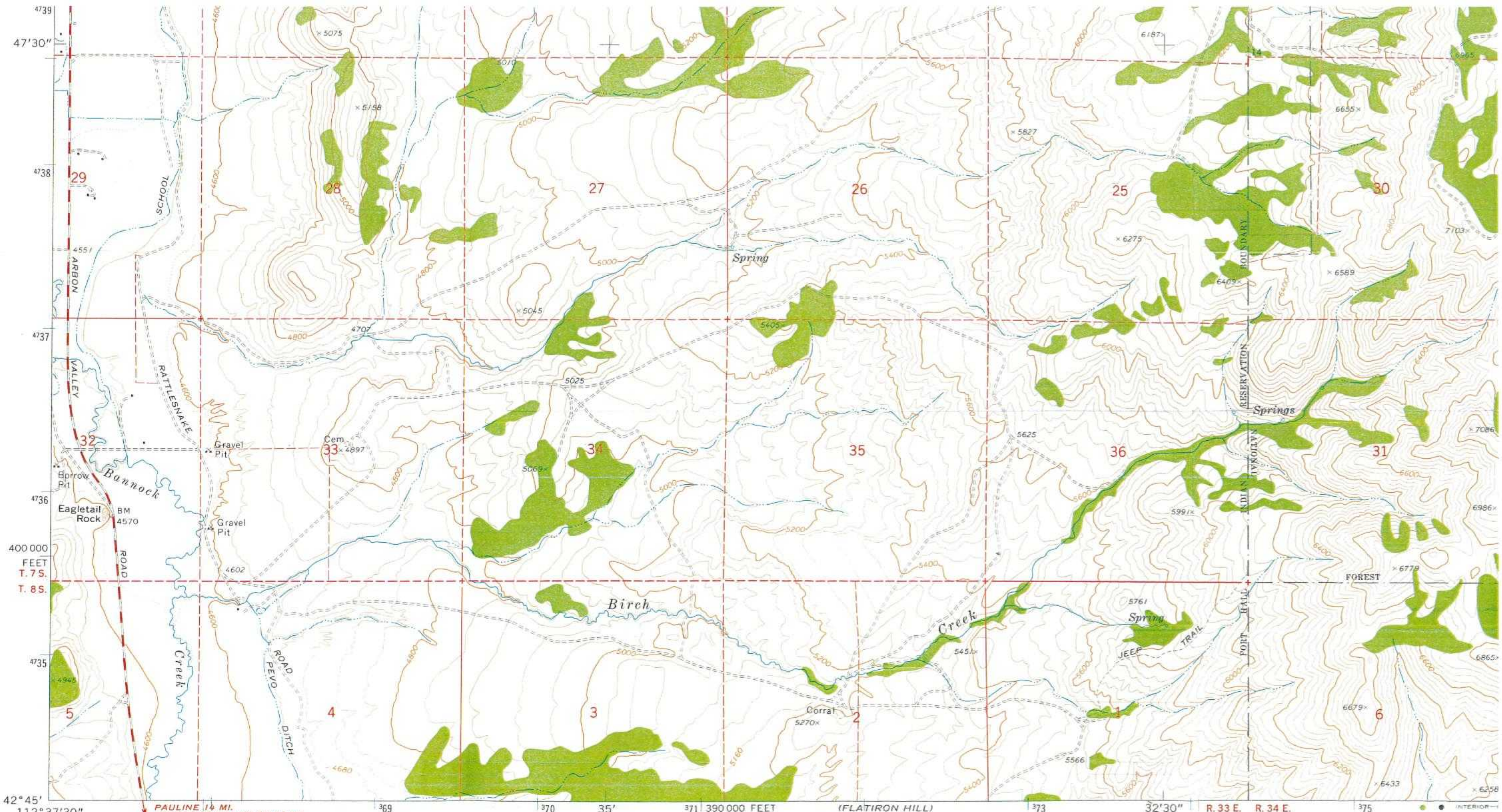
3569 IV NW
(POCATELLO NORTH)





T. 7 S.
VALLEY
ROAD
Well
4484
PIPELINE
BM
4704
Wildcat
Spring
BM
5155
BM
4988
FORT HALL
BOUNDARY
Storage
Bins
NATIONAL
FOREST
JEEP
TRAIL
Mine
BM
4564
RATTLESNAKE
Spring
Michaud
Gravel
Pit
Spring
Creek
Spring
Water
Tank
JEEP
TRAIL
ROAD
LATERAL
Bannock
Creek
3469 I SW
(WHEATGRASS BENCH)
Spring
Spring
Spring
50'
47'30"


T. 7 S.
BOUNDARY
Radio Tower
FORT HALL
NATIONAL
FOREST
BM 4988
BM 5155
BM 4704
Wildcat Spring
PIPELINE
Storage Bins
Mine
Outlaw Spring
JEEP TRAIL
Trail Creek Spring
Spring
Mithaud
Gravel Pit
Creek
Water Tank
Prospect
Kinport
Horse Lake
Dead Cow Spring
BANNOCK CO
POWER CO
FOREST
NAL
(POCATELLO SOUTH)
3569 IV SW
50′
47′30″
4744
4743
4742
4740
4739
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24



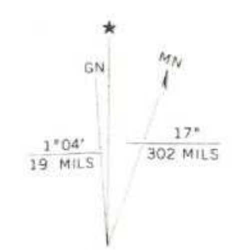
Mapped, edited, and published by the Geological Survey

Control by USGS and USC&GS

Topography by photogrammetric methods from aerial photographs taken 1969. Field checked 1971

Projection and 10,000-foot grid ticks: Idaho coordinate system, east zone (transverse Mercator)
1000-meter Universal Transverse Mercator grid ticks, zone 12, shown in blue. 1927 North American datum

Fine red dashed lines indicate selected fence lines



UTM GRID AND 1971 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

SCALE 1:24 000

1 ½ 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 .5 0 1 KILOMETER

CONTOUR INTERVAL 40 FEET
DOTTED LINES REPRESENT 20-FOOT CONTOURS
DATUM IS MEAN SEA LEVEL

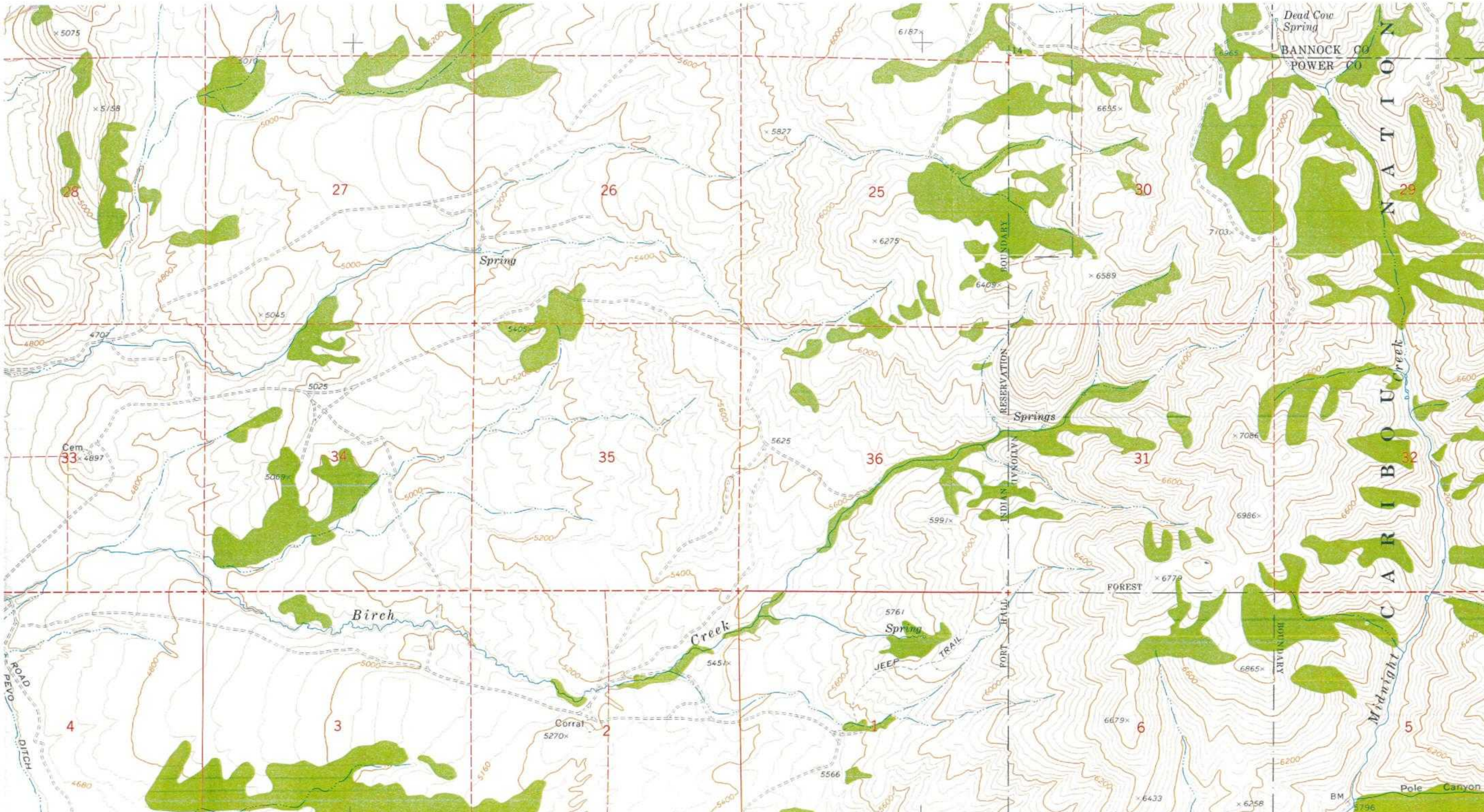
QUADRANGLE LOCATION

Primary highway, hard surface

Secondary highway, hard surface

Interstate Rout

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U. S. GEOLOGICAL SURVEY, DENVER, COLORADO 80225, OR WASHINGTON, D. C. 20242
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST



he Geological Survey

from aerial
1971

ho coordinate

grid ticks,
rican datum

ce lines

GN MN

1°04' 19 MILS

17° 302 MILS

UTM GRID AND 1971 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

SCALE 1:24 000

1 ½ 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 .5 0 1 KILOMETER

CONTOUR INTERVAL 40 FEET
DOTTED LINES REPRESENT 20-FOOT CONTOURS
DATUM IS MEAN SEA LEVEL

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U. S. GEOLOGICAL SURVEY, DENVER, COLORADO 80225, OR WASHINGTON, D. C. 20242
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

IDAHO
QUADRANGLE LOCATION

ROAD CLASSIFICATION

Primary highway, hard surface	Light-duty road, hard or improved surface
Secondary highway, hard surface	Unimproved road

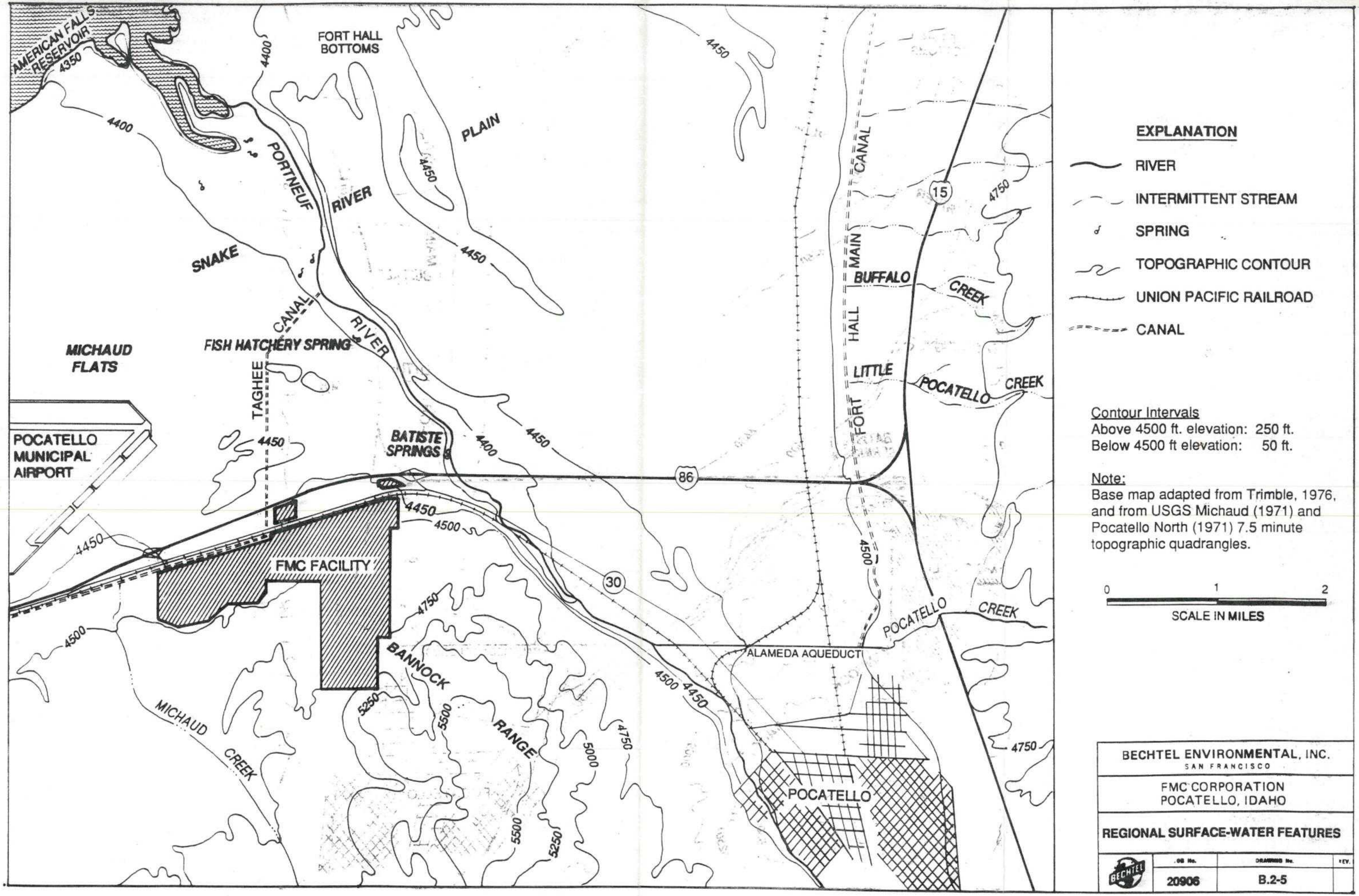
Interstate Route U. S. Route State Route

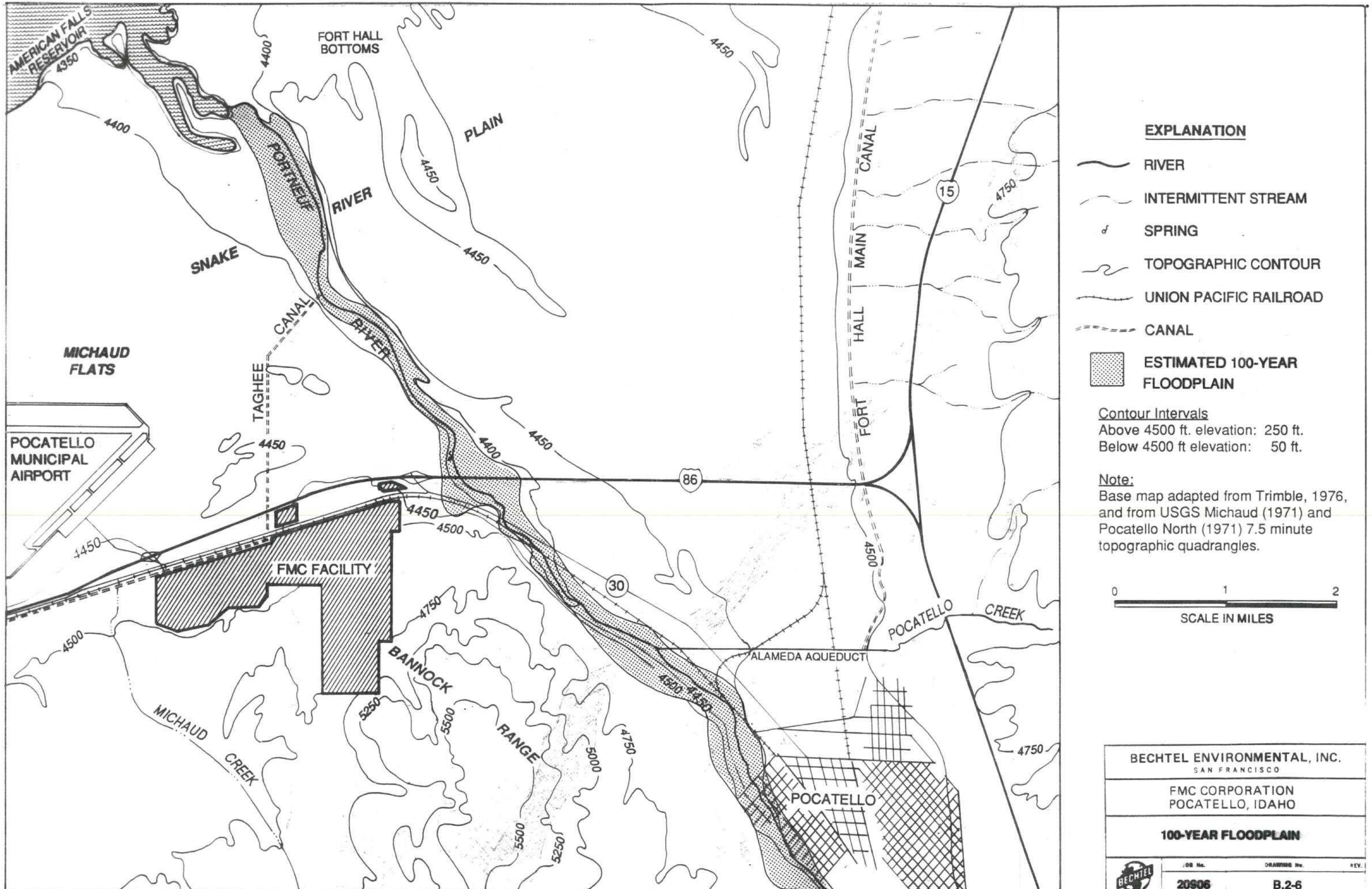
MICHAUD CREEK, IDAHO
SE/4 MICHAUD 15' QUADRANGLE
N4245—W11230/7.5

1971

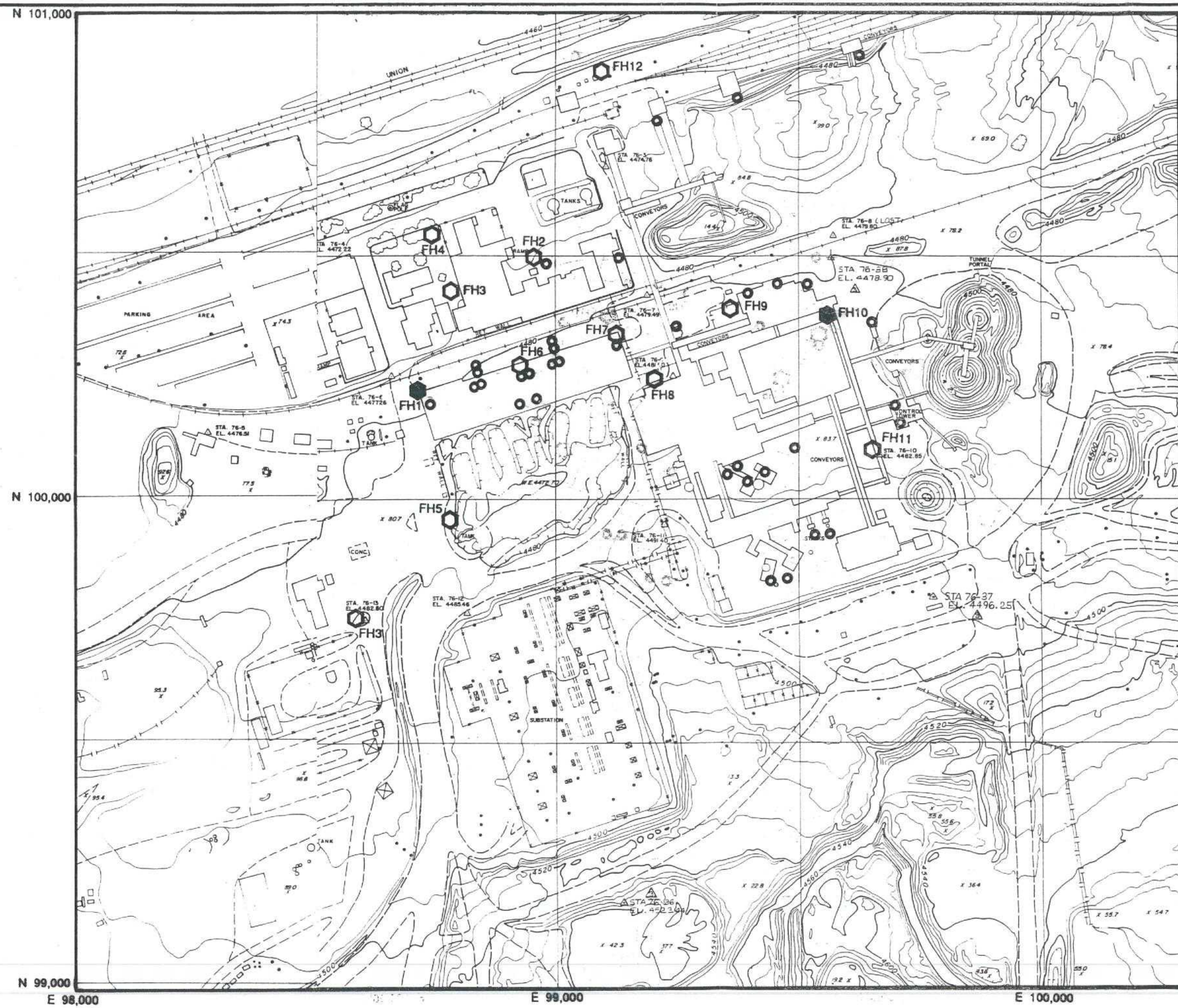
AMS 3469 I SE—SERIES V893

FIGURE B.2-4


AMERICAN FALLS RESERVOIR
4350
4400
FORT HALL BOTTOMS
PLAIN
4450
PORTNEUF RIVER
SNAKE
CANAL
RIVER
FISH HATCHERY SPRING
MICHAUD FLATS
TAGHEE
POCATELLO MUNICIPAL AIRPORT
BATISTE SPRINGS
86
FMC FACILITY
4500
30
4750
BANNOCK RANGE
5250
5500
5000
MICHAUD CREEK
ALAMEDA AQUEDUCT
POCATELLO
FORT HALL MAIN CANAL
BUFFALO CREEK
LITTLE POCATELLO CREEK
POCATELLO CREEK
15
EXPLANATION
RIVER
INTERMITTENT STREAM
SPRING
TOPOGRAPHIC CONTOUR
UNION PACIFIC RAILROAD
CANAL
Contour Intervals
Above 4500 ft. elevation: 250 ft.
Below 4500 ft elevation: 50 ft.
Note:
Base map adapted from Trimble, 1976, and from USGS Michaud (1971) and Pocatello North (1971) 7.5 minute topographic quadrangles.
0
1
2
SCALE IN MILES
BECHTEL ENVIRONMENTAL, INC.
SAN FRANCISCO
FMC CORPORATION
POCATELLO, IDAHO
REGIONAL SURFACE-WATER FEATURES
BECHTEL
20906
B.2-5


AMERICAN FALLS RESERVOIR
FORT HALL BOTTOMS
PLAIN
PORTNEUF
RIVER
SNAKE
CANAL
RIVER
MICHAUD FLATS
TAGHEE
POCATELLO MUNICIPAL AIRPORT
FMC FACILITY
BANNOCK
RANGE
MICHAUD
CREEK
FORT
HALL
MAIN
CANAL
POCATELLO
CREEK
ALAMEDA AQUEDUCT
POCATELLO
15
86
30
4350
4400
4450
4500
4750
5000
5250
5500
EXPLANATION
RIVER
INTERMITTENT STREAM
SPRING
TOPOGRAPHIC CONTOUR
UNION PACIFIC RAILROAD
CANAL
ESTIMATED 100-YEAR FLOODPLAIN
Contour Intervals
Above 4500 ft. elevation: 250 ft.
Below 4500 ft elevation: 50 ft.
Note:
Base map adapted from Trimble, 1976, and from USGS Michaud (1971) and Pocatello North (1971) 7.5 minute topographic quadrangles.
0 1 2
SCALE IN MILES
BECHTEL ENVIRONMENTAL, INC.
SAN FRANCISCO
FMC CORPORATION
POCATELLO, IDAHO
100-YEAR FLOODPLAIN
JOB No.
20906
DRAWING No.
B.2-6
REV.

sleeve
empty
31/10/92
GAB



EXPLANATION

FH3 FIRE HOUSE WITH HYDRANT

FH1 FIRE HYDRANT ONLY

STACK

ACCESS ROADS

TOPOGRAPHIC CONTOUR
Contour Interval: 4 feet
Elevations In Feet Above
Mean Sea Level

BECHTEL ENVIRONMENTAL, INC.
SAN FRANCISCO

FMC CORPORATION
POCATELLO, IDAHO

FIRE CONTROL FACILITIES, BUILDINGS, AND ROADS

JOB No.	DRAWING No.	REV.
20906	B.2-8	

143402

B.2 Topographic Maps

B.2 TOPOGRAPHIC MAPS [270.14(b)(19)]

B.2.1 Site Topography

The FMC facility is located on the southern margin of the Eastern Michaud Flats at the base of the northern most mountain of the Bannock Range (Figure E.2-1). The Michaud Flats are part of the extensive Snake River Plain. Elevations range from 4,440 feet at the northern boundary of the facility to 5,800 feet at the mountain summit. Topographic relief in the vicinity of the plant is approximately 1,400 feet. Operational areas and surface impoundments on the FMC property occur within the elevation range of 4,450 to 4,500 feet.

The Portneuf River, a major tributary of the Snake River drainage system, is the only perennial stream in the immediate vicinity of the FMC site (Figure E.2-1). The river flows northwesterly through Pocatello and discharges into the American Falls Reservoir. Prior to construction of the American Falls Dam in the 1920s, the confluence of the Portneuf and Snake rivers was approximately ten miles west of where the Portneuf River now empties into the reservoir (Trimble, 1976).

The FMC facility lies on the boundary of two major physiographic provinces, the Columbia Plateau and the Basin and Range, that contrast greatly in physical aspect and geologic history. The Snake River Plain is a slight structural depression within the Columbia Plateau that has been characterized by episodic volcanism and sedimentary deposition. The Basin and Range province, including the Bannock Range, has been actively faulted and folded, resulting in the formation of rugged, steep, northwesterly-trending mountain ranges and intervening valleys.

B.2.2 Topographic Maps

Figures B.2-1 through B.2-9 are a collection of maps submitted to fulfill the requirements of 40 CFR 270.14(b)(19). Figure B.2-1 presents the site topography which shows the boundaries of the facility and a distance of 1,000 feet around it. Figures B.2-2, B.2-3, and B.2-4 present the regional topography of the area including and surrounding the FMC facility.

Figure B.2-5 shows the regional surface waters which include the American Falls Reservoir, Portneuf River, and several springs, creeks, and streams. Figure B.2-6 shows the estimated 100-year floodplain of the Portneuf River. As shown, the estimated floodplain is more than 2,000 feet from the nearest (northeast) boundary of the facility.

Figure B.2-7 presents a wind rose for Pocatello, Idaho. The data for the three-year period (1987-1989) show the predominate winds are from the south-southwest to southwest approximately 32 percent of the time.

Figure B.2-8 shows the facility buildings and structures, fire control facilities, and plant roads and access control points.

Figure B.2-9 shows the one proposed and the eleven existing hazardous waste management units, as well as the solid waste management units on site.

The additional topographic map requirements regarding groundwater information and well locations are addressed in Section E.3.

B.2.3 Reference

Trimble, D.E., 1976, "Geology of the Michaud and Pocatello Quadrangles, Bannock and Power Counties, Idaho," U.S. Geological Survey Bulletin 1400, 88 p., 1 plate.

B.3 Location Information

B.3 LOCATION INFORMATION [270.14(b)(11)]

B.3.1 Seismicity

The site lies near the boundary of the Snake River Plain and the Basin and Range physiographic province. The Snake River Plain has been characterized by relative quiescence since the onset of the Late Pleistocene. The Basin and Range province has been subject to faulting that began in the Miocene Epoch approximately 25 million years ago and which has continued on various faults through the Late Tertiary and Quaternary to the present (Holocene).

A review of geologic literature indicates that no faults of Late Pleistocene or Holocene age are present within a 35-mile radius of the site (Witkind, 1975; Greensfelder, 1976). The most recent faulting identified as Basin and Range structure is a normal fault along the western flank of the Bannock Mountains. This fault is about eight miles long, trending generally northward and offsetting Miocene-age rock (Trimble, 1976). This fault is truncated about four miles south of the facility by what Trimble infers to be a boundary structure between the Snake River Plain and Basin and Range province.

Aerial photographs (1:40,000 scale) taken in July 1987 were obtained from the USGS Eros Data Center in Sioux Falls, South Dakota, showing the FMC facility and its immediate vicinity. A photogrammetric analysis was conducted within a five-mile radius of the site using these photographs. No lineaments were observed to transect the Late Pleistocene to Holocene sediments within the five-mile radius of the site that could be interpreted as faults.

On the basis of published geologic data and the lineament analysis, no faults exhibiting Holocene displacement were found to be present within a 3,000-foot radius of the site.

B.3.2 Surface Hydrology

The major surface water features in the vicinity of the FMC site are the Portneuf River and the American Falls Reservoir on the Snake River (Figure B.2-5).

The Portneuf River is a perennial stream with an average annual discharge of approximately 252 cubic feet per second (cfs), or 182,120 acre-feet per year, as calculated for a 51-year period of record (USGS, 1989). The discharge of the Portneuf River is recorded at USGS gauging station No. 13075500 located on the river in Pocatello at an elevation of 4,430 feet. The drainage area upstream of the gauging station is approximately 1,250 square miles.

The Portneuf River is a major tributary of the Snake River drainage system. Snake River discharge upstream of the American Falls Reservoir is gauged at USGS gauging station No. 13069500 in Blackfoot, Idaho, approximately 45 miles northeast of the FMC site. The average annual discharge calculated for the Snake River at Blackfoot is 4,054 cfs (USGS, 1974). Snake River discharge downstream of the American Falls Reservoir has been regulated by a dam since its completion in late 1926.

Numerous springs occur adjacent to the Portneuf River channel on the Snake River Plain and include Batiste (formerly Batise) Springs and Fish Hatchery Springs (Figure B.2-5). Batiste Springs, which discharges at a rate of 20 to 30 cfs (Jacobson, 1982), is less than a mile northeast of the FMC site; the Fish Hatchery Springs is approximately two miles north of the site.

Floodplain Information

Floodplain information is not available for eastern Power County in proximity to the FMC site. The only information available is that pertaining to the Portneuf River, which forms the county line between Power and Bannock counties.

Figure B.2-5 shows that the American Falls Reservoir on the Snake River is approximately five miles northwest of the FMC facility. The elevation of the reservoir is approximately 4,350 feet above mean sea level (MSL), about 100 feet below the plant grade level (4,450 feet) MSL. The flow of the Snake River is regulated by the American Falls Dam. The FMC facility would not be subject to flooding by a 100-year peak flood event on the Snake River.

The Flood Insurance Rate Map (FIRM) for the Portneuf River, published by Federal Emergency Management Agency (FEMA, 1979a,b) was consulted to evaluate the location of the FMC facility with respect to the 100-year floodplain of the Portneuf River. The 100-year floodplain as delineated by FEMA is shown in Figure B.2-6. The flood peak discharge calculated from annual flood maxima for the 100-year event at the Pocatello gauging station was estimated to be 5,500 cfs (FEMA, 1979a).

B.3.3 References

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B.4 Traffic Information

B.4 TRAFFIC INFORMATION [270.14(b)(10)]

Waste solvents, lab packs, and used Andersen filter media are loaded and transported by certified hazardous waste haulers to either a recycling site in Pocatello, Idaho (for some waste solvents), or permitted hazardous waste disposal sites in Arkansas or Utah. Since this activity is infrequent, no traffic controls have been considered necessary.

Other waste streams are subject to intrasite transportation. Liquid hazardous waste streams are sent to treatment, storage, or disposal units. Some solid hazardous wastes are placed in drums and trucked out to the disposal pond. The dried precipitator dust is scooped into haul units for transport to the waste pile. None of this traffic goes off the site. To accommodate this traffic, intraplant traffic controls include reduced speed limits on the plant roads and a right-of-way given to the haul units or heavy trucks due to their restricted visibility and maneuverability. The plant roads are either paved with asphalt or dirt roads covered with crushed slag.

B.5 BURNING PLANT WASTE

FMC Corporation is considering treatment and disposal of a phosphorus-containing hazardous waste stream from its five phosphate end-product burning plants at the Pocatello facility. The waste stream, which contains from 5 to 10 percent phosphorus, cannot currently be recycled to a finished product.

The Pocatello facility is being considered as a disposal site for the waste because its processing and disposal capabilities are compatible with the material. It is in FMC's best interest to centralize disposal of this phosphorus waste stream at Pocatello. Should the final decision be made to send these wastes to Pocatello, the Part B permit application will be amended to reflect this change.

The Pocatello facility will receive these wastes only when:

- Technology has been developed and is in place to treat the waste material to meet land disposal restriction BDATs (best demonstrated available technologies).
- The facility has received a Part B permit from EPA Region X.
- Procedures are in place to meet requirements outlined in 40 CFR 264.
- Financial assurance has been re-evaluated and the facility has proper coverage.
- The wastes have been properly characterized.

Prior to receiving the waste material at the Pocatello facility, FMC will amend the permit application and have procedures in place to address the following:

- General description of the waste stream and its handling
- Mode of shipment, schedule of receipt of wastes, quantities, and traffic controls
- Laboratory analysis plan detailing sampling points, frequency, parameters for testing, and analytical methodology
- Waste analysis supplied by the burning plants
- Inspection and analysis to ensure that each shipment meets the waste profile supplied by the burning plants.
- Treatment standards
- Manifesting and recordkeeping
- Unloading, storing, and treating

- Emergency responses
- Training
- Exposure

FMC is in the process of developing technology to ensure that BDATs are met for the waste material. This technology will recover as much elemental phosphorus as is economically practical from the waste stream and render the remaining waste stream inert.

The technologies being considered include physical separation, high temperature distillation, chemical oxidation, conversion to a satellite product, and fixation. FMC expects the final treatment process to be a mixture of several unit operations in order to meet the treatment requirements before final disposal of the stream. FMC also expects to use this technology on Pocatello phossy waste streams once land disposal restrictions are promulgated for mineral processing wastes.

C Waste Characteristics

Section C

WASTE CHARACTERISTICS

C.1 CHEMICAL AND PHYSICAL ANALYSES [270.14(b)(2), 264.13(a)]

The FMC facility became subject to regulation under the Resource Conservation and Recovery Act on March 1, 1990, with the removal of the Bevill exemption for some processing wastes generated at the facility. Any such processing waste which met the criteria for hazardous waste (40 CFR Part 261.20-24) became subject to regulation as of March 1, 1990, or July 23, 1990.

This section presents the results of the chemical and physical analyses of hazardous and non-hazardous wastes. Chemical and physical analytical data were collected for FMC's waste streams to provide a complete characterization of the plant process wastes that could be subject to RCRA Subtitle C regulations.

Chemical and physical analyses of waste streams that continue to be excluded from RCRA Subtitle C by the Bevill exclusion are not addressed in this permit application.

C.1.1 Introduction

This section describes the methods used to analyze waste samples from facility processes for the purpose of identifying the hazardous waste streams. The section then lists the hazardous and non-hazardous waste streams identified at the facility. The analytical data used to characterize those wastes are discussed in Sections C.1.2 through C.1.7.

Determination of Hazardous Wastes*

As required by RCRA, FMC has identified solid wastes generated at the facility that are hazardous wastes as defined by 40 CFR 261 and therefore subject to 40 CFR 270 permitting regulations.

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* Elemental phosphorus has unique properties which require special handling for safety reasons. Pure elemental phosphorus will burn whenever there is a readily available supply of oxygen. This reaction produces a dense, heavy white smoke of phosphorus pentoxide. To prevent this reaction and to protect human health and the environment, phosphorus and all phosphorus-containing wastes are kept in water, i.e., in an oxygen-deprived environment. Waste streams that contain phosphorus also contain water for safety and are stored in surface impoundments covered with water. This is an industry-wide practice for which there are no technological alternatives at this time.

Phossy wastes, defined as waste materials containing small amounts of phosphorous, are not reactive per the definition contained in 40 CFR 261.23 because they do not meet any of the criteria listed. Laboratory results included in this section state that phossy wastes are reactive. The off-site analytical laboratory used the visual observation of white smoke as a determination that the phossy wastes were reactive; however, observation of white smoke is not one of the 40 CFR 261.23 criteria. The reaction that was taking place was not with water, as specified in the criteria, but with oxygen supplied when the sample container was opened. The lack of reaction occurring in the ponds at the facility substantiates FMC's position that phossy wastes are not reactive within the definition of 40 CFR 261.23.

Waste streams at the FMC facility were determined to be hazardous based on (1) knowledge of plant processes, (2) analytical results using the extraction procedure (EP) toxicity test and toxicity characteristic leaching procedure (TCLP), and (3) test results for the hazardous waste characteristics of corrosivity, ignitability, and reactivity.

Chemical and Physical Analyses Before September 1990. Waste stream samples collected in 1989 were extracted using the EP toxicity test for eight metals: arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver. Waste stream extracts were then analyzed for metals using inductively coupled plasma (ICP), EPA Method 6010. If the detection limit of any of the eight metals listed above exceeded the maximum contaminant level (MCL) for the characteristic of EP toxicity, the extracts were reanalyzed using graphite furnace atomic absorption (GFAA), EPA Method-7000 Series. In addition to metals analysis, the 1989 samples were tested for the hazardous waste characteristics of corrosivity, ignitability, and reactivity. Corrosivity was tested using the EPA test method for pH (Method 5.2) as specified in "Test Methods for the Evaluation of Solid Waste, Physical and Chemical Methods," EPA SW-846, third edition, 1986, and for a liquid that corrodes steel as specified in the National Association of Corrosion Engineers (NACE) Standard TM-01-69 as standardized in EPA SW-846. Ignitability was tested using a Pensky-Martens Closed Cup Tester as specified in ASTM Standard D-3278-78.

The EPA test methods for reactivity and ignitability were not designed for waste samples containing elemental phosphorus. Elemental phosphorus has the property of burning when supplied with oxygen. The reaction produces phosphorus pentoxide smoke. The analytical laboratory tested for reactivity by exposing the wastes to air, thereby providing oxygen. The observed reaction was white smoke. However, according to the definition in 40 CFR 261.23 of reactivity, the presence of smoke does not make the waste sample "reactive." Phosphorus waste samples do not meet the criteria for reactivity as defined in 40 CFR 261.23.

The analytical laboratory tested for ignitability by drying or heating the samples. In so doing, any phosphorus on the sample was supplied with an oxygen source and in some instances ignited. However, according to the definition of ignitability in 40 CFR 261.21, under standard pressure and temperature, Andersen filter media does not ignite. Applying heat to any phosphorus-containing waste may cause it to ignite. However, applying heat is not part of the criteria for ignitability as defined in 40 CFR 261.21.

Standard EPA contract laboratory program (CLP) analytical protocols were followed during sample analysis. Prior to September 1990, analytical data were generated using standard industrial quality assurance/quality control (QA/QC) reporting requirements, with minimal reporting of QC data.

QA/QC data and information provided by the analytical laboratory are not included in this permit application, but are available for inspection at the facility, as are the completed chain-of custody forms for the samples.

Chemical and Physical Analyses After September 1990. The March 29, 1990, Federal Register revised the extraction procedure for characterizing solid wastes as hazardous. The toxicity characteristic leaching procedure (TCLP), replaced the previous extraction procedure toxicity characteristic, or EP toxicity test. The change became effective on September 25, 1990. Although the change in the extraction procedure for toxicity testing did not require resampling and analysis of waste streams previously analyzed using the EP toxicity test, FMC determined that five waste streams should be reanalyzed for the eight RCRA metals. The streams were reanalyzed as part of FMC's ongoing compliance program to confirm past determinations of hazardous waste using the EP toxicity test.

Waste stream samples were resampled in September 1990 and were extracted using the TCLP test for the eight metals: arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver.

Standard EPA methods were used for the leaching procedure and chemical analyses. Prior to extraction using the TCLP test, if the waste sample contained suspended solids, the solids were filtered, the filtrate saved, and the solids extracted. The leached liquids were recombined with saved liquids (filtrate), and the recombined sample analyzed for the eight metals. Waste stream extracts were analyzed for metals using inductively coupled plasma (ICP), EPA Method 6010. If the detection limit of any of the eight metals listed above exceeded the maximum contaminant level (MCL) for the characteristic of EP toxicity, the extracts were reanalyzed using graphite furnace atomic absorption (GFAA), EPA Method-7000 Series.

The following waste streams were sampled in September 1990:

- Precipitator slurry (furnace off-gas solids)
- Phossy wastes (process wastes stored in surface impoundments with water)
- Medusa (furnace) scrubber blowdown
- Pond 8S recovery process (residue, discharge to pond 15S)
- Andersen filter media used in the furnace building (one unit for each furnace), resampled November 1990

Prior to September 1990, analytical data were generated using standard industrial quality assurance/quality control (QA/QC) reporting requirements, with minimal reporting of QC data. FMC has since requested that the analytical laboratory provide a more complete QC data set along with analytical data reported. Data generated after September 1990 contain more extensive QC data. QA/QC data and information provided by the laboratory are not included in this permit application, but are available for inspection at the facility, as are the completed chain-of custody forms for the samples.

Hazardous Wastes

On the basis of knowledge of plant processes and analytical results from the performance of EP toxicity and TCLP tests, the following waste streams have been identified as hazardous wastes:

- Precipitator slurry/dust (furnace off-gas solids)
- Andersen filter media from the furnace scrubbers, phos dock, and pond 8S recovery process
- Laboratory solvents, paint solvents, and degreaser solvents
- Furnace (Medusa) and phos dock scrubber blowdown water
- Furnace washdown phossy water
- Waste water liquor - the phossy water in ponds 8S and 15S

The primary data characterizing the six hazardous waste streams generated and managed by FMC at the facility are given in Sections C.1.2 through C.1.6. A summary of the hazardous waste streams is presented in Table C.1.1-1.

Non-Hazardous Wastes

FMC has identified two non-hazardous waste streams. The waste streams are:

- Ferrophos - Ferrophos is tapped beneath the slag from the bottom of the furnace. Ferrophos, collected in sand molds inside the furnace building, consists of iron and phosphorus compounds. It is stored in various piles on-site and later sold for its metal content. → not water
- Phossy wastes - Phossy wastes are the solids carried out to the surface impoundments. Although the wastes are chemically reactive, they are not reactive as defined in 40 CFR 261.23.

Analytical data for the characterization of the two non-hazardous waste streams are provided and discussed in Section C.1.7.

Excluded Wastes

This section describes wastes excluded from the permit application by the Bevill exemption.

Wastes resulting from the extraction and beneficiation of the phosphate shale ore, coke and silica remain exempted from RCRA Subtitle C regulation. Facility operations occurring prior to reactions in the electric arc furnaces are considered beneficiation and continue to be excluded from RCRA hazardous waste regulations (40 CFR 261.4(b)(7)). These operations include: unloading, stacking, reclaiming, and transpórting of shale ore, coke, and silica; grinding, sizing, and storage of these materials; and forming and calcining of the briquettes. Proportioning and burdening operations are also excluded from RCRA hazardous waste regulations.

The Bevill exemption was also retained for the slag resulting from elemental phosphorus production. Thus, slag is excluded from RCRA hazardous waste regulations.

Recent EPA regulations require that listed wastes and wastes failing one of the characteristic tests (40 CFR 261.20-24) be managed as RCRA hazardous wastes provided they are generated as part of the process operations.

Wastes from Off-site FMC Facilities

At this time, the facility does not receive hazardous waste from off-site; however, FMC may in the future decide to utilize the phossy waste storage capabilities at the Pocatello facility for phossy wastes from other FMC facilities. FMC would take the appropriate steps at that time to amend the facility RCRA Part B permit and establish standard operating procedures, recordkeeping programs, and a treatment technology as required by 40 CFR 270 and 264 prior to receipt of wastes from other FMC facilities (see Section B.5).

Table C.1.1-1
SUMMARY OF RCRA HAZARDOUS WASTES

	Hazardous Waste Stream[(a)]	Physical Characteristic	Contains Phosphorus (Yes/No)	Hazardous Waste Constituent/ Characteristic	EPA Hazardous Waste Identification Number	Hazardous Waste Management Unit
1.	Used Andersen filter media from furnaces (4), phos dock, and pond 8S recovery process	Solid	No	Cadmium, Arsenic	D006, D004	2, 4
2.	Precipitator dust[(b)]	Solid	No	Cadmium	D006	6, 9, 11
	Precipitator slurry[(b)]	Suspended solid	Yes	Cadmium	D006	6, 9, 11
3.	Laboratory solvents	Liquid	Yes	Solvents	F005, F003, D001, D003	1
	Paint solvents	Liquid	No	F-listed	F003, F004, F005	1
	Degreasing solvents	Liquid	No	F-listed	F001	1
4.	Scrubber blowdown:					
	Medusa	Liquid	Yes	Cadmium	D006	12
	Phos dock	Liquid	Yes	Cadmium	D006	8
5.	Furnace washdown (tiger pits)	Liquid	Yes	Cadmium	D006	5, 8
6.	Ponds 8S and 15S waste water liquor	Liquid	Yes	Cadmium	D006	3, 4, 7

(a) The Bevil exclusion is retained for any waste generated prior to the burden entering the furnace. Burden is defined as the proportioned mixture of calcined shale nodules, silica, and coke that is charged to the four furnaces.
(b) Furnace off-gas solids.

C.1.2 Andersen Filter Media

This section presents information on the sources of Andersen filter media, sample collection methodology, and analytical procedures. It then provides the analytical data used in the characterization of Andersen filter media as a hazardous waste.

General Description

Andersen scrubber filter media is a solid, glass fiber filter approximately 1/4 inch thick used to remove dust, metal fumes, and particulate matter from the gas stream prior to discharge to the atmosphere. Andersen filter media is used in 3-foot-diameter rolls which are advanced to a clean section of the roll when particulate matter and fume buildup increases the pressure drop across the filter. Used Andersen filter media is rolled up on the other side of the filter holder and periodically removed.

Three separate processes generate Andersen filter media: the furnaces, the phos dock and pond 8S recovery process. The used filter media is considered hazardous waste and is currently being sent to a licensed disposal facility in Utah. Used filter media is stored at the site until a full shipment can be sent to the disposal site.

A block diagram, Figure C.1.2-1, shows the relationship between the sources of used Andersen filter media and the hazardous waste management unit being permitted.

Sample Collection and Analysis

Sampling Location. Samples of used Andersen filter media were collected from the furnaces, phos dock, and pond 8S recovery process while the units were operating. Andersen filter media samples were collected from the used roll before it was removed from the take-up roll. A rectangular piece of the Andersen filter media was obtained from the used roll. The filter media was visually inspected prior to cutting the samples for uniformity and presence of particulate matter. These samples were cut from the center of the roll and represented "worst case" samples. Andersen filter media samples were collected from the phos dock and the pond 8S recovery process in June 1990. Filter media samples were also collected from the furnace building scrubbers and the phos dock scrubbers in November 1990.

Analytical Method. All samples were analyzed using the TCLP leach test. The TCLP leach test was performed on a sample collected from each of the four furnaces and on individual samples from the phos dock and pond 8S recovery process.

Analytical Data

A contaminant summary is provided in Table C.1.2-1. Analytical data for samples collected in June 1990 and November 1990 are presented in Table C.1.2-2. Raw analytical data are provided in Appendix C-1.

Analytical results for Andersen filter media samples collected in June 1990 are presented below. Cadmium concentrations for two of the samples collected from the pond 8S recovery process exceeded the toxicity characteristic (TC) regulatory limit of 1.0 mg/L for TCLP extracts. Cadmium concentrations for the two samples were 2.3 and 1.3 mg/L. The hazardous waste characteristic of ignitability is exceeded if Andersen filter media samples have a flash point less than 140°F as determined by a Pensky-Martens Closed Cup Tester, using the test specified in ASTM Standard D-93-79. The waste samples contained elemental phosphorus which will burn when exposed to oxygen. The above-referenced test is not designed for samples containing phosphorus. Observed results for the ignitability of the phos dock samples were due to elemental phosphorus in the waste samples.

Since Andersen filter media is not an aqueous solution, the results on the phos dock sample do not meet the corrosivity criteria in 40 CFR 261.22 for hazardous waste.

Analytical results for Andersen filter media samples collected in November 1990 are presented below. The arsenic concentration of 26 mg/L detected in sample number 4, collected from one of the furnaces exceeded the TC regulatory limit for arsenic of 5.0 mg/L. Cadmium concentrations for all of the Andersen filter media samples collected from the four furnaces scrubbers, and a phos dock scrubber sample exceeded the TC regulatory limit of 1.0 mg/L. Cadmium concentrations detected in the Andersen filter media samples collected from the four furnace scrubbers ranged from 2.0 to 42 mg/L. A concentration range of 0.69 to 1.4 mg/L was found for samples collected from the phos dock scrubber. Samples from pond 8S recovery process ranged from 0.47 to 2.3 mg/L. The level of selenium in the filter media sample from #2 furnace scrubber equalled the TC regulatory limit.

Andersen filter media generated at the FMC facility is hazardous because it failed the toxicity characteristic test using the TCLP procedure for cadmium (EPA Hazardous Waste Number D006) and may fail for arsenic (EPA Hazardous Waste Number D004).

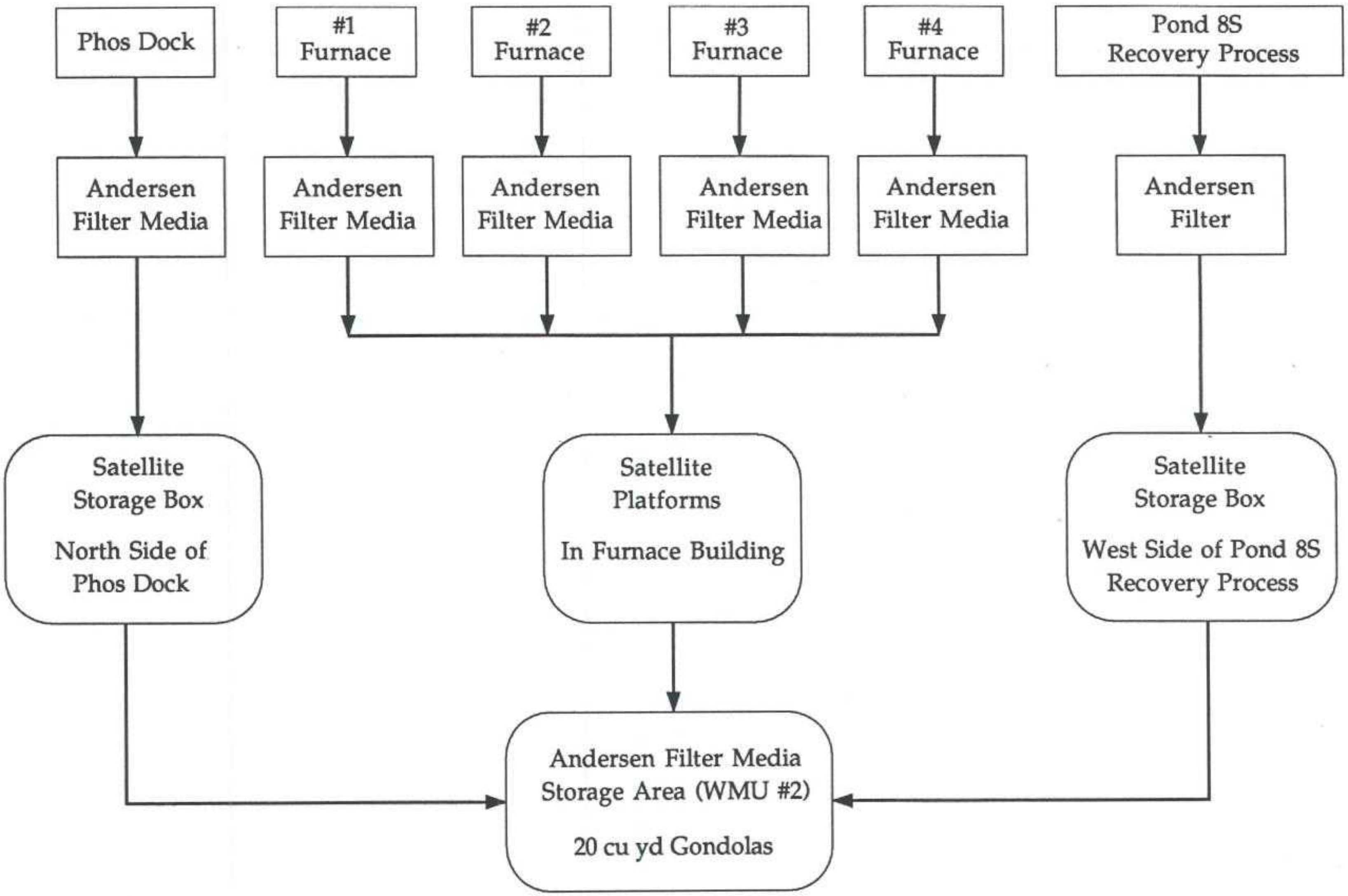

Figure C.1.2-1
Andersen Filter Media Block Flow Diagram

Table C.1.2-1
ANDERSEN FILTER MEDIA SUMMARY
(Toxicity Characteristic Leaching Procedure)

Parameter	Number of Samples Analyzed	Number of Samples in Which Detected	Frequency of Detection (percent)	Minimum Concentration Detected (mg/L)	Maximum Concentration Detected (mg/L)	Sample in Which Max. Detected	Arithmetic Mean (mg/L)
Arsenic	12	11	92	0.3	26	Furnace 4	4.1
Barium	12	7	58	0.05	0.18	Furnaces 1 & 4	0.1
Cadmium	12	12	100	0.47	42	Furnace 2	9.0
Chromium	12	12	100	0.19	2.3	Furnace 3	0.9
Lead	12	4	33	0.1	0.2	Phos Dock 94 & 97	0.2
Mercury	12	0	0	NA	NA	NA	NA
Selenium	12	2	17	0.3	1.0	Furnace 2	0.7
Silver	12	0	0	NA	NA	NA	NA

NA: Not applicable

Table C.1.2-2
ANDERSEN FILTER MEDIA ANALYTICAL DATA
Toxicity Characteristic Leaching Procedure
(All units in mg/L unless otherwise indicated)

Source	Furnace	Furnace	Furnace	Furnace	Phos Dock	Phos Dock	Phos Dock	Phos Dock	8S Process	8S Process	8S Process	8S Process	Toxicity Characteristic Regulatory Limit
FMC #	1	2	3	4	94	95	96	97	98	99	100	101	
Lab #	13220-1	13220-2	13220-3	13220-4	12457-1	12457-2	12457-3	12457-4	12457-5	12457-6	12457-7	12457-8	
Date Sampled	11/15/90	11/15/90	11/15/90	11/15/90	6/15/90	6/16/90	6/17/90	6/18/90	6/18/90	6/18/90	6/18/90	6/18/90	
Parameter													
Arsenic	2.5	4	1.7	26	2.1	1.3	1.9	1.7	ND	0.3	0.5	3.3	5.0
Barium	0.18	ND	0.12	0.18	0.09	0.11	0.05	0.07	ND	ND	ND	ND	100.0
Cadmium	36	42	2.0	20	1.4	0.90	0.85	0.69	2.3	1.3	0.47	0.53	1.0
Chromium	1.6	1.6	2.3	1.0	0.67	0.99	0.70	0.67	0.46	0.35	0.19	0.22	5.0
Lead	ND	ND	ND	0.1	0.2	ND	0.1	0.2	ND	ND	ND	ND	5.0
Mercury	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.2
Selenium	ND	1.0	0.3	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.0
Silver	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5.0
Hazardous Waste Characteristic													
Corrosivity (pH)	NA	NA	NA	NA	1.6	1.6	1.4	1.4	1.3	1.4	2.4	1.9	≤2.0 or ≥12.5 (a)
Ignitability (°F)	NA	NA	NA	NA	135	135	116	114	>215	>215	>215	>215	140 (a)

Source: Federal Register, Volume 55, No. 61, March 29, 1990
(a) Source: 40 CFR Part 261
NA: Not analyzed
ND: Not detected

C.1.3 Precipitator Slurry/Dust (Furnace Off-Gas Solids)

This section presents a general description of how the precipitator slurry/dust is generated, sampled, and analyzed. It then provides the analytical data for characterization of the precipitator slurry/dust (furnace off-gas solids).

General Description

As mentioned in Section B, precipitator dust from furnace electrostatic precipitators is slurried and then pumped to pond 8E where the solids settle out. Precipitator dust is slurried only as a safety precaution because of its phosphorus content. The water added to the precipitator dust prevents fire and safety hazards. The furnace off-gas solids are referred to as precipitator slurry until the precipitator slurry is dried in pond 9E. Once dried, the precipitator slurry is called precipitator dust. Precipitator dust is eventually stored in the precipitator dust storage pile (area 9S) below ground level.

A block diagram, Figure C.1.3-1, shows the relationship between the sources of the precipitator slurry/dust and the hazardous waste management units being permitted.

Precipitator slurry/dust is a newly identified waste subject to RCRA Subtitle C regulation. It contains cadmium and phosphorus. The phosphorus in the precipitator slurry (which varies) makes it burn upon exposure to oxygen.

Sample Collection and Analysis

Sampling Locations. The sampling location for the precipitator slurry/dust is the precipitator slurry sampling port located outside the west end of the furnace building. Precipitator slurry samples are collected here for safety purposes. Representative samples of precipitator slurry/dust should be collected when precipitator slurry is being pumped.

Analytical Method. Two precipitator slurry and four precipitator dust samples were collected in November 1989. These samples were analyzed using the EP toxicity test for the eight RCRA metals: arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver. One additional precipitator slurry sample was collected in September 1990 and analyzed using the TCLP test for the eight RCRA metals.

Two precipitator slurry samples collected in November 1989 were also tested for the hazardous waste characteristics of corrosivity, ignitability, and reactivity. Corrosivity was tested using the EPA test method for pH (Method 5.2) as specified in "Test Methods for the Evaluation of Solid Waste, Physical and Chemical Methods," EPA SW-846, third edition, 1986, and for a liquid that corrodes steel as specified in the National Association of Corrosion Engineers (NACE) Standard TM-01-69 as standardized in EPA SW-846.

The characteristic of ignitability can be tested using a Pensky-Martens Closed Cup Tester as specified in ASTM Standard D-93-79 or a Setaflash Closed Cup Tester as specified in ASTM Standard D-3278-78. The tests for reactivity, EPA Methods 9030 and 9010, and ignitability were not designed for elemental phosphorus wastes. Wastes containing phosphorous are not reactive within the determination of 40 CFR 261.23.

Analytical Data

A summary for the precipitator slurry/precipitator dust samples is provided in Table C.1.3-1. Analytical data for the precipitator slurry/dust are presented in Table C.1.3-2. Raw analytical data for the precipitator slurry/dust are provided in Appendix C-2.

Precipitator Slurry. One of the three precipitator slurry samples (#74) collected in November 1989 exceeded the toxicity characteristic (TC) regulatory limit of 1.0 mg/L for cadmium with a concentration of 2.7 mg/L. Sample #74 was analyzed using the EP toxicity test. A subsequent precipitator slurry sample collected in September 1990 and analyzed using the TCLP leach test, however, had a cadmium concentration of 0.27 mg/L, within the TC regulatory limit for cadmium.

Precipitator Dust. All four precipitator dust samples (P.D.2, P.D.3, P.D.4, and P.D.5) collected in November 1989 exceeded the TC regulatory limit for cadmium, with concentrations ranging from 2.2 to 6.9 mg/L. The TC regulatory limit for cadmium is 1.0 mg/L.

Precipitator slurry/dust are hazardous wastes because they fail the TCLP toxicity characteristic test for cadmium. Although precipitator slurry sample #74 was observed to be "reactive" by the analytical laboratory, it did not exhibit reactivity according to the definition in 40 CFR 261.23. (See the footnote on page C-1.)

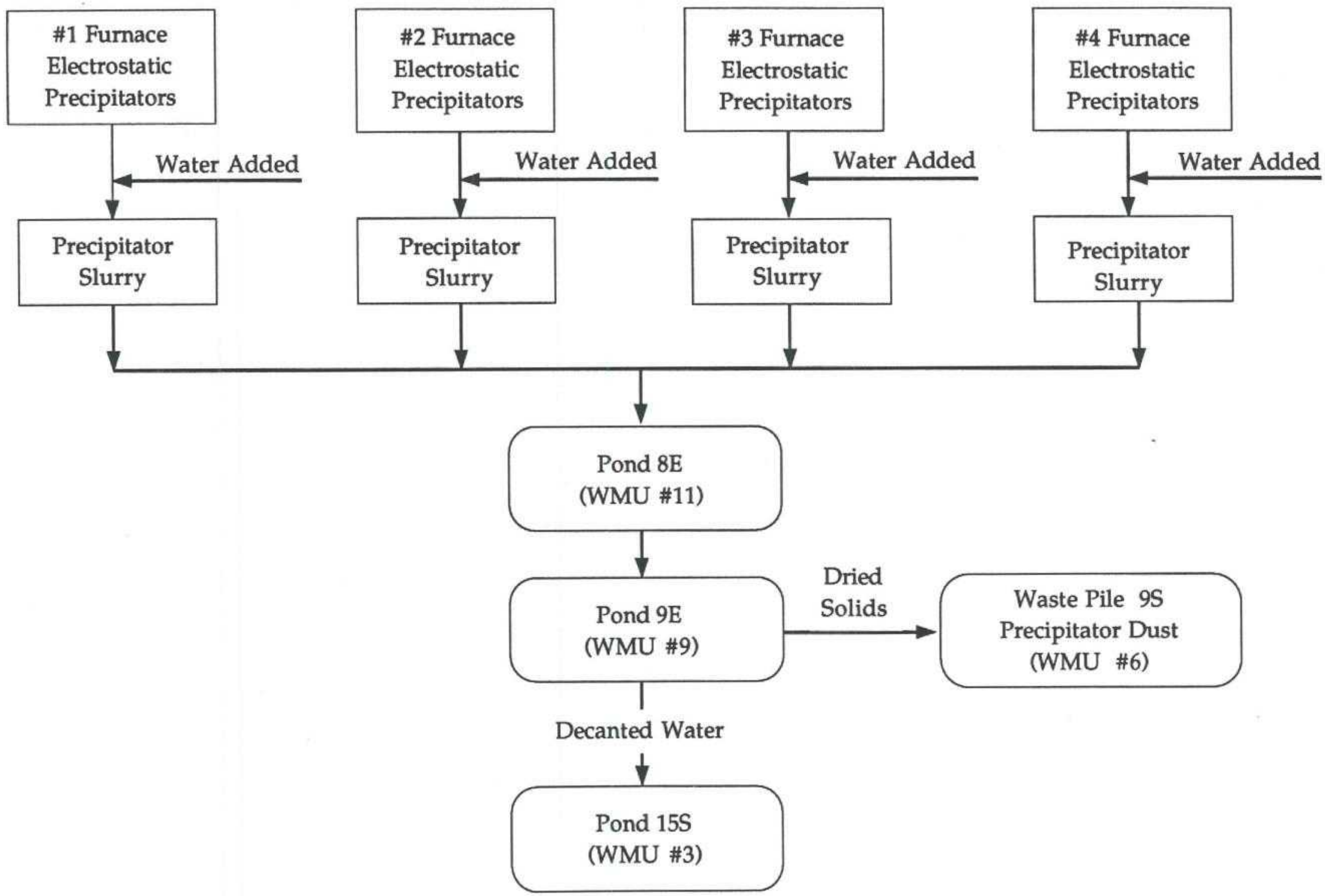

Figure C.1.3-1
Precipitator Slurry/Dust (Furnace Off-Gas Solids) Block Flow Diagram

Table C.1.3-1
FURNACE OFF-GAS SOLIDS SUMMARY
(Precipitator Slurry and Precipitator Dust)

	Number of Samples Analyzed	Number of Samples in Which Detected	Frequency of Detection (percent)	Minimum Concentration Detected (mg/L)	Maximum Concentration Detected (mg/L)	Sample in Which Max. Detected	Arithmetic Mean (mg/L)
Parameter							
Arsenic	7	4	57	0.9	1.3	P.D. 2	1.1
Barium	7	1	14	0.09	0.09	P.S. 1	0.1
Cadmium	7	7	100	0.21	6.9	P.D. 2	3.6
Chromium	7	5	71	0.05	1.5	P.S. 74	0.6
Lead	7	3	43	0.2	1.1	P.S. 74	0.6
Mercury	7	0	0	NA	NA	NA	NA
Selenium	7	0	0	NA	NA	NA	NA
Silver	7	0	0	NA	NA	NA	NA
Hazardous Waste Characteristic							
Corrosivity (pH)	2	2	100	6.3	6.5	P.S. 75	6.4
Corrosivity (NACE)(mm/yr)	2	2	100	0.1	0.3	P.S. 74	0.2
Ignitability (°F)	2	0	0	NA	NA	NA	NA
Reactivity	2	1	50	NA	NA	P.S. 74	NA

NA: Not applicable
P.D.: Precipitator dust
P.S.: Precipitator slurry

Table C.1.3-2
FURNACE OFF-GAS SOLIDS ANALYTICAL DATA
(Precipitator Slurry and Precipitator Dust)
(all units in mg/L unless otherwise indicated)

Source	Precipitator Slurry	Precipitator Slurry	Precipitator Slurry	Precipitator Dust	Precipitator Dust	Precipitator Dust	Precipitator Dust	Toxicity Characteristic Regulatory Limit
FMC #	Precipitator Slurry	74	75	P.D. 2	P.D. 3	P.D. 4	P.D. 5	
Lab #	12952-1	11883-10	11883-11	11774-2	11774-3	11774-4	11774-5	
Date Sampled	9/26/90	11/17/89	11/17/89	11/10/89	11/10/89	11/10/89	11/10/89	
Analytical Method	TCLP	EP TOX	EP TOX	EP TOX	EP TOX	EP TOX	EP TOX	
Parameter								
Arsenic	ND	ND	ND	1.3	1.1	1.0	0.9	5.0
Barium	0.09	ND	ND	ND	ND	ND	ND	100.0
Cadmium	0.21	2.7	0.92	6.9	5.9	6.5	2.2	1.0
Chromium	0.28	1.5	0.5	0.05	0.05	ND	ND	5.0
Lead	0.2	1.1	0.5	ND	ND	ND	ND	5.0
Mercury	ND	ND	ND	ND	ND	ND	ND	0.2
Selenium	ND	ND	ND	ND	ND	ND	ND	1.0
Silver	ND	ND	ND	ND	ND	ND	ND	5.0
Hazardous Waste Characteristic								
Corrosivity (pH)	NA	6.3	6.5	NA	NA	NA	NA	≤2.0 or ≥12.5 (a)
Corrosivity (NACE)(mm/yr)	NA	0.3	0.1	NA	NA	NA	NA	6.35 (a)
Ignitability (°F)	NA	>210	>210	NA	NA	NA	NA	140 (a)
Reactivity	NA	R yes	No NR	NA	NA	NA	NA	Yes (a)

NACE: National Association of Corrosion Engineers
ND: Not detected
NA: Not applicable
NR: Non-reactive
R: Reactive
(a) Source: 40 CFR Part 261

only tested slurry not dust when slurry is dry it may be ignitable/reactive

C.1.4 Waste Laboratory Solvents, Paint Solvents, and Degreasing Solvents

This section presents a description of how the liquid waste laboratory, paint, and degreasing solvents are generated, sampled, and analyzed. It then provides the analytical data used to characterize the solvents as hazardous wastes.

General Description

Waste laboratory solvents are generated at the FMC laboratory. Waste paint and degreasing solvents are generated in the FMC paint shop and maintenance/ machine shop. Waste laboratory solvents may be a mixture of toluene, xylene, benzene, and phosphorus. The phosphorus content of laboratory solvents varies from 0.4 to 1.0 percent.

Waste paint solvents may be a mixture of xylene, toluene, methyl ethyl ketone, ethylbenzene, paint wastes and water. Waste degreasing solvents may be a mixture of 1,1,1-trichloroethane, methylene chloride, dirt, oil, and water.

The chemical characteristics and EPA hazardous waste number for waste laboratory, paint, and degreasing solvents are listed in the following.

Waste Solvent	Chemical/Characteristic	EPA Hazardous Waste Number
Laboratory solvents	Toluene, benzene	F005
	Xylene	F003
	Reactive	D003
	Ignitable	D001
Paint solvents	Non-halogenated solvents	F003, F004, F005
Degreasing solvents	Spent halogenated solvents	F001

Waste laboratory solvents, degreasing solvents, and paint solvents are placed in 55-gallon drums which are temporarily stored in a hazardous waste storage area and periodically shipped off-site for disposal.

A block diagram, Figure C.1.4-1, shows the relationship between the sources of the waste solvents and the hazardous waste management units being permitted.

Sample Collection and Analysis

Sampling Location. Drums containing waste laboratory, paint, and degreasing solvents were sampled from full drums transferred to the drum storage area. Grab samples of laboratory solvents, paint solvents, and degreasing solvents were collected in November 1989 and submitted to the laboratory for analysis.

Analytical Method. The grab sample of laboratory solvents (#71) was submitted to an off-site laboratory for RCRA characterization: eight RCRA metals using the EP toxicity leach test and corrosivity, ignitability, and reactivity tests. The grab samples of paint solvents (#73) and degreasing solvents (#72) were analyzed for F-listed wastes, which included base/neutral/acids or semivolatile organics (EPA Method 8270).

Analytical Data

Analytical data for waste laboratory, paint, and degreasing solvents are presented in Table C.1.4-1. Raw analytical data are provided in Appendix C-3.

The laboratory solvent sample (#71) exhibited the characteristic of ignitability with a flash point of 104 °F, below the flash point lower limit of 140 °F set for the ignitability characteristic.

Methyl ethyl ketone, toluene, ethylbenzene, and xylenes were detected in the paint solvent sample (#73).

Methylene chloride, 1,1,1-trichloroethane, toluene, tetrachloroethene, ethylbenzene, and xylenes were detected in degreasing solvent sample (#72).

The waste laboratory paint, and degreasing solvents generated at the FMC facility are hazardous wastes because they contain listed non-halogenated solvents (F003, F005) and halogenated (F001) solvents. The waste laboratory solvents also fail the EPA characteristic test for ignitability.

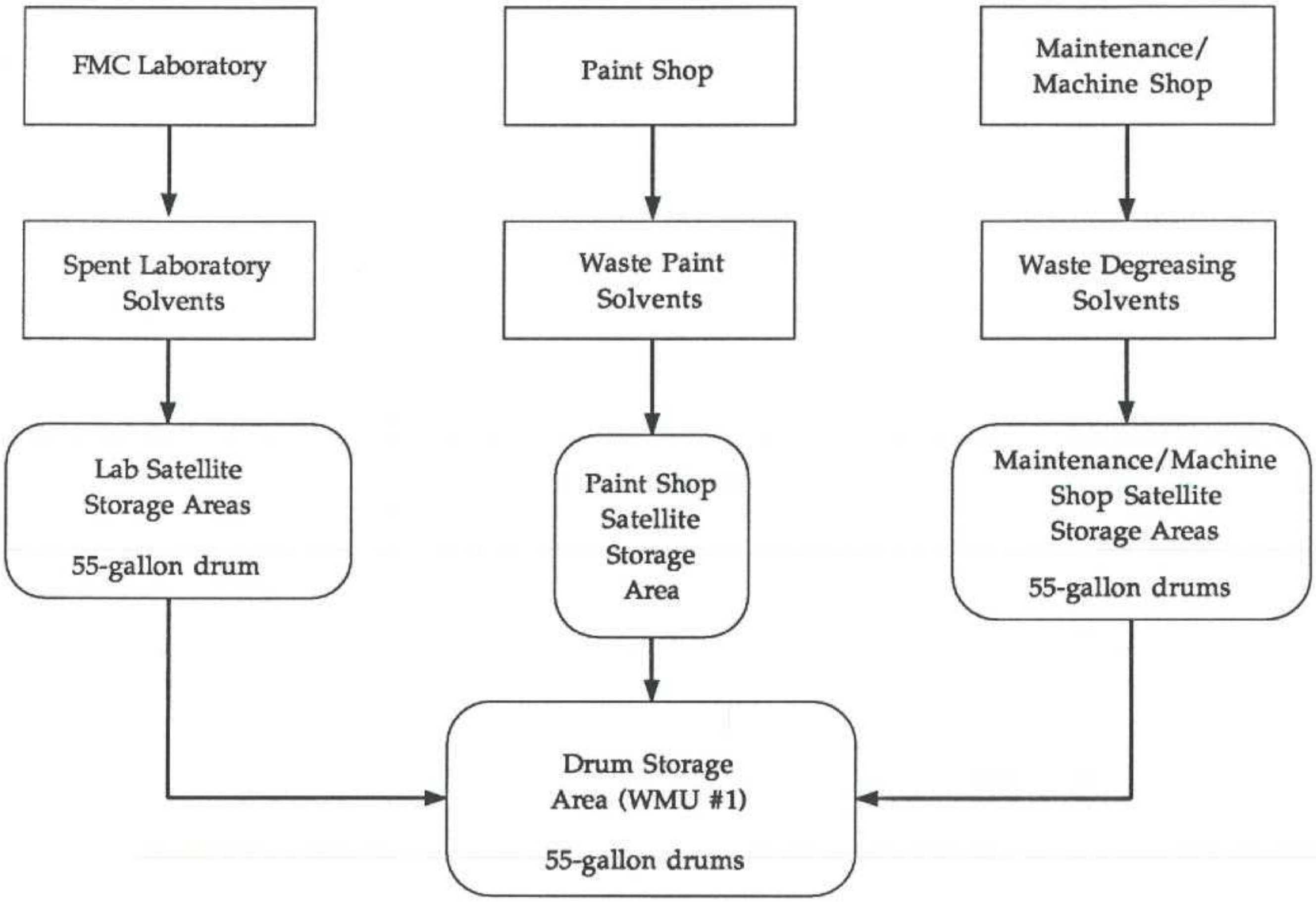

Figure C.1.4-1
Waste Solvents Block Flow Diagram

Table C.1.4-1
LABORATORY, PAINT, AND DEGREASING SOLVENTS
ANALYTICAL DATA

	Laboratory Solvent #71	Paint Solvent #73	Degreasing Solvent #72
Organics (mg/L)			
Methyl Ethyl Ketone	(a,b)	1,800	ND (100)
Methylene Chloride	(a,b)	ND (100)	67,000
1,1,1-Trichloroethane	(a,b)	ND (100)	610,000
Toluene	(a,b)	56,000	710
Tetrachloroethene	(a,b)	ND (100)	3,500
Ethylbenzene	(a,b)	16,000	2,000
Xylenes	(a,b)	63,000	11,000
Inorganics (mg/L)			
Arsenic	2.8	(b)	(b)
Barium	ND (0.02)	(b)	(b)
Cadmium	ND (0.01)	(b)	(b)
Chromium	1.1	(b)	(b)
Lead	0.12	(b)	(b)
Mercury	ND (0.06)	(b)	(b)
Selenium	ND (0.1)	(b)	(b)
Silver	ND (0.01)	(b)	(b)
Hazardous Waste Characteristic			
Corrosivity (pH)	Not Applicable	(b)	(b)
Corrosivity (NACE), mm/yr	0.4	(b)	(b)
Ignitability (°F)	104	(b)	(b)
Reactivity	Reactive	(b)	(b)

ND: Not detected; numbers in parentheses are detection limits.

(a) Waste solvents generated by the FMC laboratory comprise listed aromatics and halogenated hydrocarbons. Waste characteristics of laboratory solvents are documented in manifests for off-site disposal. Analysis of laboratory waste solvents for organics has not been requested or performed.

(b) Not analyzed.

C.1.5 Furnace (Medusa) and Phos Dock Scrubber Blowdown

Scrubber blowdown is liquid and may contain small amounts of suspended solids. This section describes how it is generated, sampled, and analyzed. It then presents the laboratory analytical data used to characterize scrubber blowdown as a hazardous waste.

General Description

Furnace Medusa Scrubber Blowdown. Slag and ferrophos are tapped in a hood-type arrangement so that the fugitive emissions generated during the tapping process can be collected. These emissions first pass through a Medusa wet venturi action scrubber and then through Andersen filter media scrubbers. The Medusa scrubber blowdown goes to a waste water treatment tank where it undergoes lime treatment. The pH of the water is adjusted to 4.7 or higher before it is sent to the calciner ponds. Scrubber blowdown water is clarified in the calciner ponds, and the clarified water is then recycled back to the calciner scrubber.

A block diagram, Figure C.1.5-1, shows the relationship between the Medusa scrubbers, the source of the blowdown, and the hazardous waste management unit being permitted.

Phos Dock Scrubber Blowdown. The phosphorus loading dock (phos dock) condenses and stores elemental phosphorus from the furnaces prior to loading in railroad cars.

The scrubbers in the phos dock treat process emissions associated with the phos dock operations. The scrubbers produce blowdown which is sent to the Phase IV ponds for clarification; the clarified water is recycled back to the plant.

A block diagram, Figure C.1.5-2, shows the relationship between the phos dock, the source of the scrubber blowdown, and the hazardous waste management units being permitted.

Sample Collection and Analysis

Sampling Locations.

Furnace Medusa Scrubber Blowdown. Samples collected prior to September 1990 were obtained from the second floor of the furnace building. Samples were collected during slag and metal taps in order to get "worst case" samples.

Samples collected in September 1990 were obtained from the second floor of the furnace building where the waste water exits from each scrubber. Samples were collected from six sampling locations. Samples were collected from the closest generation of the waste under hazardous conditions, requiring both a silver suit and face shield in order to obtain the "worst case" samples.

Phos Dock Scrubber Blowdown. Scrubber waste water is pumped from the sump in the phos dock Andersen scrubber building to the scrubbers for reuse. The blowdown is the waste water that is periodically removed from the sump to prevent the buildup of chemical constituents. The samples were collected from the recycle pump sump in the scrubber building.

Analytical Method. The samples collected in 1989 were analyzed using the EP toxicity test for the eight RCRA metals: arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver. In addition to metals analysis, the 1989 samples were tested for the hazardous waste characteristics of corrosivity, ignitability, and reactivity. Corrosivity was tested using the EPA test method for pH (Method 5.2) as specified in "Test Methods for the Evaluation of Solid Waste, Physical and Chemical Methods," EPA SW-846, Third edition, 1986, and for a liquid that corrodes steel as specified in the National Association of Corrosion Engineers (NACE) Standard TM-01-69 as standardized in EPA SW-846. Ignitability was tested using a Pensky-Martens Closed Cup Tester as specified in ASTM Standard D-3278-78. As discussed in Section C.1.1, the standard laboratory tests for reactivity are not appropriate for the FMC samples.

Analytical Data

A contaminant summary is provided in Table C.1.5-1 for blowdown samples from the furnace Medusa scrubbers. Analytical data for scrubber blowdown samples collected in September 1990 and November 1989 are presented in Table C.1.5-2. Raw analytical data are presented in Appendix C-4.

Eight of the ten samples analyzed exceeded the TC regulatory limit for cadmium of 1.0 mg/L. Concentrations ranged from 0.2 to 5.2 mg/L, with an average concentration of 2.52 mg/L. The highest concentrations were detected in samples collected from the Medusa scrubber blowdown, FMC samples 2W and 4E. These two samples had cadmium concentrations of 5.2 and 5.1 mg/L, respectively.

Additionally, the two samples collected from the phos dock had cadmium concentrations of 2.9 and 3.0 mg/L. These two samples also were below the hazardous waste characteristic criterion for corrosivity (pH) of 2.0. Each sample had a pH of 1.7.

The eight Medusa scrubber blowdown samples are considered hazardous wastes because they exceeded the TC limit for cadmium. The phos dock scrubber blowdown samples exceeded the TC limit and the corrosivity characteristic criterion.

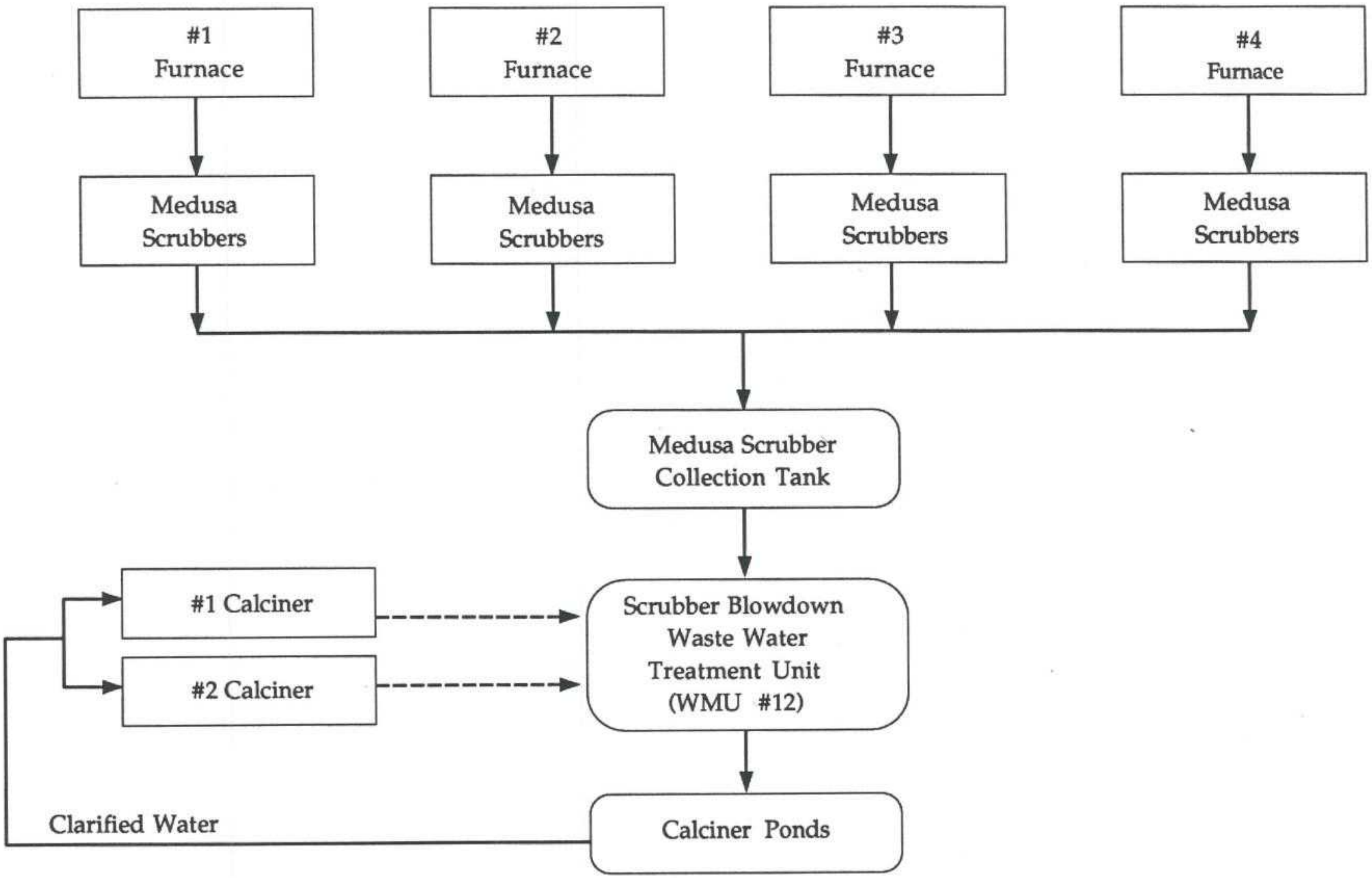

Figure C.1.5-1
Medusa Scrubber Blowdown Block Flow Diagram

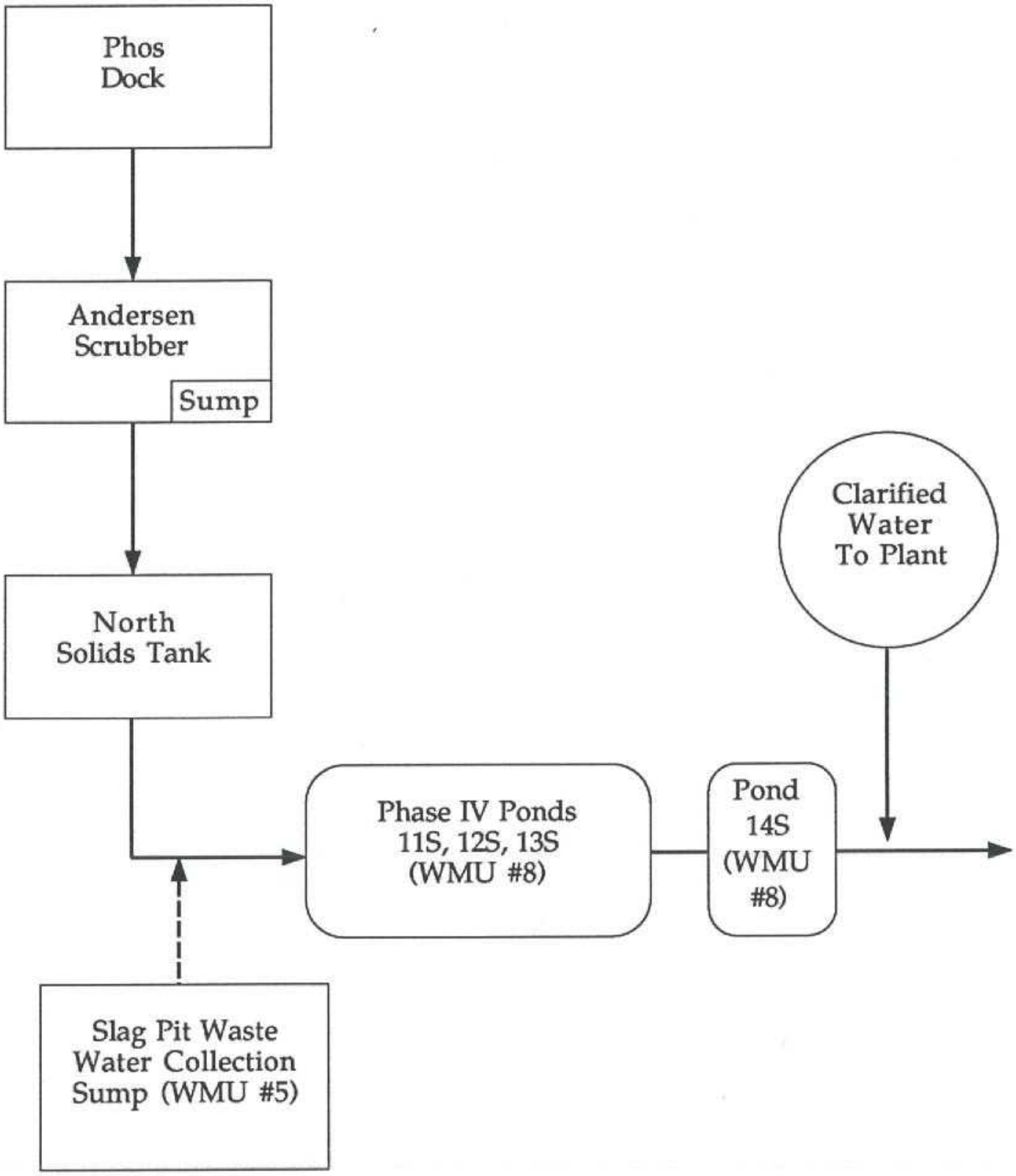

Figure C1.5-2
Phos Dock Scrubber Blowdown Block Flow Diagram

Table C.1.5-1
FURNACE MEDUSA SCRUBBER BLOWDOWN SUMMARY

Parameter	Number of Samples Analyzed	Number of Samples in Which Detected	Frequency of Detection (percent)	Minimum Concentration Detected (mg/L)	Maximum Concentration Detected (mg/L)	FMC # in Which Max. Detected	Arithmetic Mean (mg/L)
Arsenic	8	3	37.5	0.30	1	1W	0.57
Barium	8	1	12.5	0.2	0.2	31-32 (1E)	0.20
Cadmium	8	8	100	0.2	5.2	2W	2.42
Chromium	8	8	100	0.5	2.2	31-32 (1E)	1.31
Lead	8	4	50	0.36	3.2	1W	1.15
Mercury	8	0	0	NA	NA	NA	NA
Selenium	8	1	12.5	0.10	0.10	29-30 (4W)	0.10
Silver	8	2	25	0.44	2.8	31-32 (1E)	1.62

NA: Not applicable

Table C.1.5-2
SCRUBBER BLOWDOWN ANALYTICAL DATA
(all units in mg/L unless otherwise indicated)

Source	Furnace Medusa	Furnace Medusa	Furnace Medusa	Furnace Medusa	Furnace Medusa	Furnace Medusa	Furnace Medusa	Furnace Medusa	Phos Dock	Phos Dock	
FMC #	4E	2W	3E	4E	1W	1E	29-30 (4W)	31-32 (1E)	25 & 26	27 & 28	Toxicity
Lab #	12932-1	12932-2	12932-3	12932-4	12932-5	12932-6	11775-5	11775-6	11775-3	11775-4	Characteristic
Date Sampled	9/26/90	9/26/90	9/26/90	9/27/90	9/27/90	9/27/90	11/11/89	11/11/89	11/12/89	11/13/89	Regulatory
Analytical Method	TCLP	TCLP	TCLP	TCLP	TCLP	TCLP	EP TOX	EP TOX	EP TOX	EP TOX	Limit
Parameter											
Arsenic	ND	ND	ND	ND	1	ND	0.30	0.42	0.6	0.6	5.0
Barium	ND	ND	ND	ND	ND	ND	ND	0.2	0.13	0.13	100.0
Cadmium	3.2	5.2	0.2	5.1	1.7	1.8	0.63	1.5	2.9	3.0	1.0
Chromium	1.3	1.0	1.2	1.6	1.5	1.2	0.5	2.2	0.64	0.67	5.0
Lead	ND	ND	ND	0.6	3.2	ND	0.36	0.42	0.34	0.37	5.0
Mercury	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.2
Selenium	ND	ND	ND	ND	ND	ND	0.10	ND	ND	ND	1.0
Silver	ND	ND	ND	ND	ND	ND	0.44	2.8	0.18	0.18	5.0
Hazardous Waste Characteristic											
Corrosivity (pH)	5.8	6.3	5.9	5.4	6.4	5.0	4.6	2.3	1.7	1.7	≤2.0 or ≥12.5(a)
Corrosivity (NACE) (mm/yr)	0.09	0.08	0.13	ND	0.12	0.14	ND	2.8	NA	NA	6.8(a)
Ignitability (°F)	NA	NA	NA	NA	NA	NA	>200	>200	>200	>200	<140(a)

NACE: National Association of Corrosion Engineers
TCLP: Toxicity characteristic leaching procedure
EPTOX: EP toxicity test
NA: Not analyzed
ND: Not detected
(a) Source: 40 CFR Part 261

C.1.6 Phossy Water

Phossy water, as the term is generally used in the plant, refers to any water that contains phosphorus. It also contains suspended and dissolved solids in varying amounts. In this permit application, "phossy water" is used to mean phossy water that is non-hazardous. Ponds 8S and 15S contain "phossy water" which is hazardous, and, in this permit application, is called "waste water liquor." Furnace washdown is also a hazardous "phossy water" waste stream.

This section presents the laboratory analytical data used to characterize three "phossy water" waste streams: the non-hazardous phossy water waste stream, and two streams that are also normally called phossy water but that were determined to be hazardous - the waste water liquor from ponds 8S and 15S, and furnace washdown water.

General Description

Phossy water is pumped to the Phase IV ponds where it is clarified and recycled back into the plant process. The Phase IV ponds can also receive waste water liquor from pond 15S for level control. This is not a common practice and only happens to maintain freeboard in pond 15S.

Pond 15S receives pond 8S recovery process waste streams, decant water from 9E and can receive phossy water from the Phase IV ponds for level control. These streams comprise 15S waste water liquor. The plant ceased putting phossy waste into pond 8S in 1981. This pond currently receives water only from the pond 8S recovery process and waste water liquor from pond 15S for level control.

Furnace washdown phossy water is from numerous sources in the furnace building. This water passes out the south side of the furnace building, through the slag pit and is collected in the slag pit sump. There is an ongoing project, as discussed in Section B, to remove this waste stream from the slag pit. Furnace washdown phossy water will be collected in a tank at the southeast corner of the furnace building and pumped to the Phase IV ponds.

A block diagram, Figure C.1.6-1, shows the relationship between the sources of the phossy water and the hazardous waste management units being permitted.

Sample Collection and Analysis

Sampling Locations. The sampling locations for the furnace washdown are the tiger pits in the slag pit. Samples were collected while the furnaces were in operation. Waste water liquor samples were taken from pond 15S. Phossy water samples were taken from a sampling valve outside the east end of the furnace building, the slag pit sump, and pond 14S. Waste samples collected prior to September 1990 were composited by FMC.

Analytical Method. The samples collected in 1989 were analyzed using the EP toxicity test for eight RCRA metals: arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver. The samples collected in 1990 were analyzed for these same metals using the TCLP test. In addition to metals analysis, the 1989 samples were tested for the hazardous waste characteristics of corrosivity, ignitability, and reactivity. Corrosivity was tested using the EPA test method for pH (Method 5.2) as specified in "Test Methods for the Evaluation of Solid Waste, Physical and Chemical Methods," EPA SW-846, third edition, 1986, and for a liquid that corrodes steel as specified in the National Association of Corrosion Engineers (NACE) Standard TM-01-69 as standardized in EPA SW-846. Ignitability was tested using a Closed Cup Tester as specified in ASTM Standard D-3278-78. As previously discussed in Section C.1.1, the standard laboratory tests for reactivity that were used were not appropriate for the FMC samples.

Analytical Data

A summary for furnace washdown phossy water is provided in Table C.1.6-1. Analytical data for furnace washdown phossy water samples collected in November 1989 and September 1990 are presented in Table C.1.6-2.

The pond 15S waste water liquor analytical data for samples collected in November 1989 are presented in Table C.1.6-3. FMC has determined that pond 8S waste water liquor is hazardous because of its similarity to pond 15S waste water liquor.

A summary for non-hazardous phossy water is provided in Table C.1.6-4. Analytical data for phossy water are provided in Table C.1.6-5. Raw analytical data are provided in Appendix C-5.

Three of the samples had cadmium concentrations in excess of the toxicity characteristic regulatory limit of 1.0 mg/L. Two of these samples, collected from pond 15S, had cadmium concentrations of 1.9 and 2.0 mg/L. The third sample was collected from tiger pit 8 in the slag pit area, and had a cadmium concentration of 1.7 mg/L. In addition, the sample from pond 15S with a cadmium concentration of 2.0 mg/L also exhibited the hazardous waste characteristic of ignitability. The flash point of this sample was 98°F as determined by a Pensky-Marten Closed Cup Tester, below the hazardous waste characteristic criteria flash point of 140°F. Since these samples exceeded the TC regulatory limits, they are considered hazardous wastes.

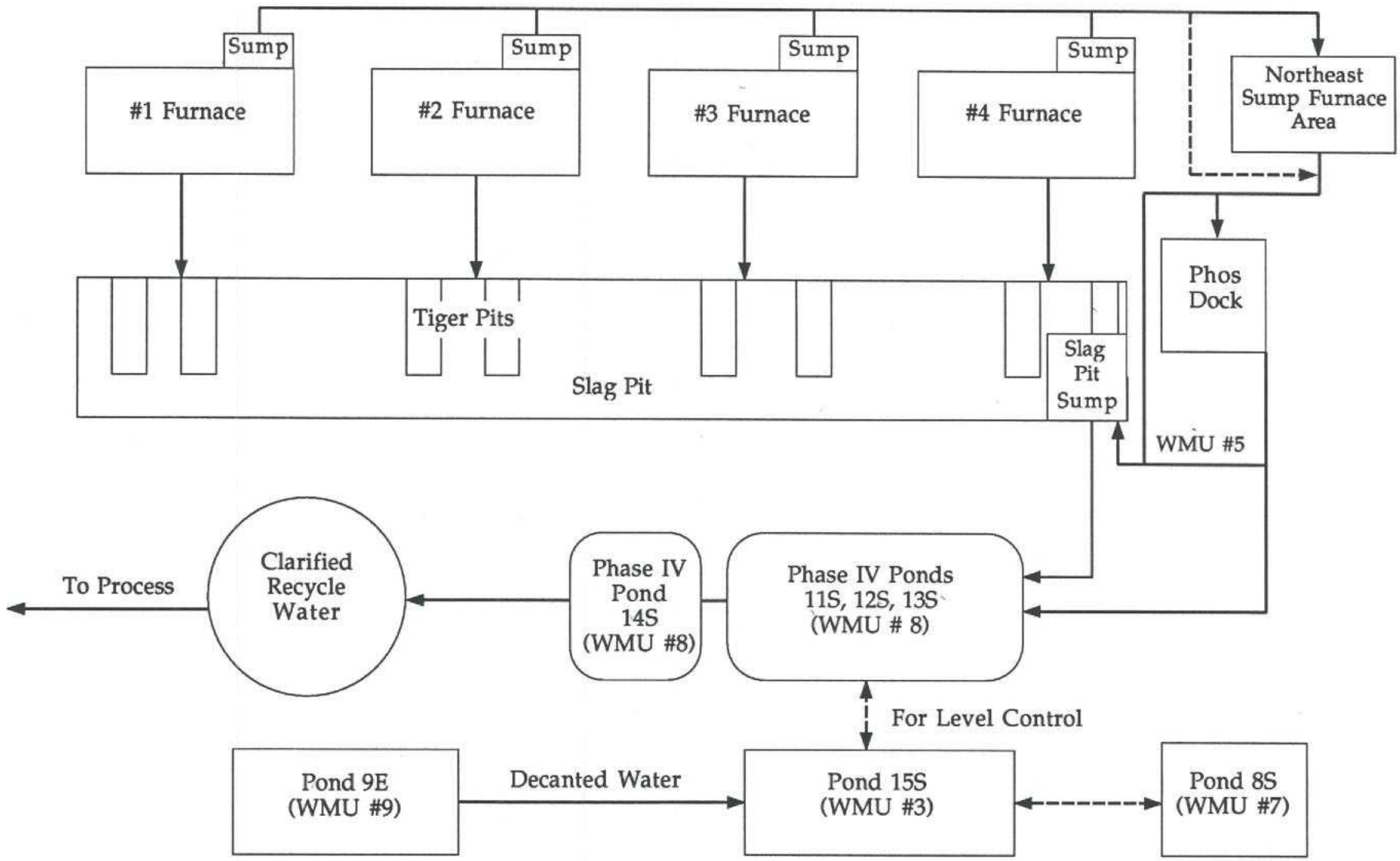

Figure C.1.6-1
Phossy Water Block Flow Diagram

Table C.1.6-1
FURNACE WASHDOWN PHOSSY WATER SUMMARY

Parameter	Number of Samples Analyzed	Number of Samples in Which Detected	Frequency of Detection (percent)	Minimum Concentration Detected (mg/L)	Maximum Concentration Detected (mg/L)	FMC ID# in Which Max. Detected	Arithmetic Mean (mg/L)
Arsenic	3	0	0	NA	NA	NA	NA
Barium	3	1	33	0.09	0.09	Tiger Pit-4	0.09
Cadmium	3	3	100	0.02	1.7	Tiger Pit-8, 62	0.65
Chromium	3	3	100	0.15	0.26	Tiger Pit-8, 62	0.20
Lead	3	0	0	NA	NA	NA	NA
Mercury	3	0	0	NA	NA	NA	NA
Selenium	3	0	0	NA	NA	NA	NA
Silver	3	0	0	NA	NA	NA	NA

NA: Not applicable

Table C.1.6-2
FURNACE WASHDOWN PHOSSY WATER ANALYTICAL DATA
(all units in mg/L unless otherwise indicated)

Source	Tiger Pit-4	Tiger Pit-8	Tiger Pit-8	
Location	Slag Pit	Slag Pit	Slag Pit	
FMC ID #	Tiger Pit-4	61	62	Toxicity
Lab ID #	12952-3	11882-19	11882-20	Characteristic
Date Sampled	9/26/90	11/11/89	11/11/89	Regulatory
Analytical Method	TCLP	EP TOX	EP TOX	Limit
Parameter				
Arsenic	ND	ND	ND	5.0
Barium	0.09	ND	ND	100.0
Cadmium	0.02	0.22	1.7	1.0
Chromium	0.20	0.15	0.26	5.0
Lead	ND	ND	ND	5.0
Mercury	ND	ND	ND	0.2
Selenium	ND	ND	ND	1.0
Silver	ND	ND	ND	5.0
Hazardous Waste Characteristic				
Corrosivity (pH)	NA	6.4	6.5	≤ 2.0 or ≥ 12.5 (a)
Corrosivity (NACE) (mm/yr)	NA	ND	ND	6.8 (a)
Ignitability (°F)	NA	>210	>210	<140°F (a)
Reactivity	NA	R	R	R (a)

NA: Not analyzed
R: Reactive
ND: Not detected
(a) Source: 40 CFR Part 261

Table C.1.6-3
POND 15S WASTE WATER LIQUOR ANALYTICAL DATA
(all units in mg/L unless otherwise indicated)

Source	15S	15S	
FMC #	57	59	Toxicity
Lab #	11882-15	11882-17	Characteristic
Date Sampled	11/11/89	11/11/89	Regulatory
Analytical Method	EP TOX	EP TOX	Limit
Parameter			
Arsenic	0.9	ND	5.0
Barium	ND	ND	100.0
Cadmium	1.9	2.0	1.0
Chromium	1.4	1.5	5.0
Lead	0.98	0.65	5.0
Mercury	0.0004	0.0006	0.2
Selenium	ND	ND	1.0
Silver	ND	0.1	5.0
Hazardous Waste Characteristic			
Corrosivity (pH)	6.1	6.9	≤ 2.0 or ≥ 12.5 (a)
Corrosivity (NACE) (mm/yr)	ND	ND	6.8 (a)
Ignitability (°F)	>210	98	<140°F (a)
Reactivity	NR	NR	R (a)

(a): Source: 40 CFR Part 261
ND: Not detected
NACE: National Association of Corrosion Engineers
NR: Non-reactive
R: Reactive

Table C.1.6-4
PHOSSY WATER SUMMARY

Parameter	Number of Samples Analyzed	Number of Samples in Which Detected	Frequency of Detection (percent)	Minimum Concentration Detected (mg/L)	Maximum Concentration Detected (mg/L)	Sample in Which Max. Detected	Arithmetic Mean (mg/L)
Arsenic	9	0	0.0	NA	NA	NA	NA
Barium	9	2	22.2	0.1	0.13	Phossy Water	0.115
Cadmium	9	8	88.9	0.03	0.6	53	0.19
Chromium	9	8	88.9	0.08	0.41	Phossy Water	0.22
Lead	9	2	22.2	0.063	0.10	53	0.08
Mercury	9	2	22.2	0.0005	0.0009	55	0.0007
Selenium	9	0	0.0	NA	NA	NA	NA
Silver	9	0	0.0	NA	NA	NA	NA

NA: Not applicable

Table C.1.6-5
PHOSSY WATER ANALYTICAL DATA
(All units in mg/L unless otherwise indicated)

Source	Nonclarified(d)	Nonclarified	Nonclarified	14S Clarified	14S Clarified	Toxicity Characteristic Regulatory Limit
FMC ID#	47(a)	49(b)	50(b)	53	55	
Lab ID#	11882-5	11882-7	11882-8	11882-11	11882-13	
Date Sampled	11/9-11/89	11/12-13/89	11/12-13/89	11/13/89	11/13/89	
Analytical Method	EP TOX	EP TOX	EP TOX	EP TOX	EP TOX	
Parameter						
Arsenic	ND	ND	ND	ND	ND	5.0
Barium	ND	ND	ND	ND	ND	100.0
Cadmium	0.09	0.14	0.06	0.6	0.5	1.0
Chromium	0.11	0.13	0.12	0.2	0.2	5.0
Lead	ND	ND	ND	0.10	0.063	5.0
Mercury	ND	ND	ND	0.0005	0.0009	0.2
Selenium	ND	ND	ND	ND	ND	1.0
Silver	ND	ND	ND	ND	ND	5.0
Hazardous Waste Characteristic						
Corrosivity (pH)	5.0	4.6	4.8	6.3	6.3	≤2.0 or ≥ 12.5 (e)
Corrosivity (NACE) (mm/yr) (c)	ND	ND	ND	ND	ND	6.8 (e)
Ignitability (°F)	>210	>210	>210	>210	>210	<140°F (e)
Reactivity	NR	NR	NR	NR	NR	R(e)

(a) Three days' composite
(b) Two days' composite
(c) NACE: National Association of Corrosion Engineers
(d) Clarified: Phossy water going from the Phase IV ponds to the plant for reuse
Nonclarified: Phossy water going into Phase IV ponds
(e) Source: 40 CFR Part 261
ND: Not detected
NR: Non-reactive
R: Reactive
NA: Not applicable

C.1.7 Non-hazardous Wastes

This section presents the laboratory analytical data documenting the determination that ferrophos and phossy wastes are non-hazardous wastes.

Ferrophos

Ferrophos is a byproduct of furnace operation. The ferrophos is collected in sand molds, cooled, and stored on-site for sale.

Sample Collection and Analysis. Ferrophos waste samples are grab samples. The ferrophos samples collected in 1989 were analyzed using the EP toxicity test for eight RCRA metals: arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver.

Analytical Data. Ferrophos wastes generated at FMC are non-hazardous wastes. The analytical data used in making this determination are summarized in Table C.1.7-1. Raw analytical data are provided in Appendix C-6.

Phossy Wastes

This section presents the laboratory analytical data used to characterize phossy wastes as non-hazardous waste.

Phossy wastes do not exceed any TC limit for metals. Phossy waste samples were judged by the laboratory to be reactive because of smoke produced upon exposure to the air. As implied by the name, all phossy wastes contain some percentage of elemental phosphorus. As explained in Section C.1.1, phosphorus-contaminated wastes are not reactive as defined in 40 CFR 261.23.

Phossy wastes, defined as waste materials containing small amounts of phosphorous, are not reactive per the definition contained in 40 CFR 261.23 because they do not meet any of the criteria listed. Laboratory results included in this section state that phossy wastes are reactive. The off-site analytical laboratory used the visual observation of white smoke as a determination that the phossy wastes were reactive; however, observation of white smoke is not one of 40 CFR 261.23 criteria. The reaction that was taking place was not with water, as specified in the criteria, but with oxygen supplied when the sample container was opened. The lack of reaction occurring in the ponds at the facility substantiates FMC's position that phossy wastes are not reactive within the definition of 40 CFR 261.23.

General Description. Phossy wastes are defined as solids contaminated with phosphorus regardless of generation locations in the plant. Phossy wastes contain solids and sediments mixed with phosphorus. These wastes settle out of phossy water in ponds 11S, 12S, and 13S, and are disposed of in pond

15S. Prior to 1981, these wastes were disposed of in pond 8S. Pond 14S is a surge pond used to recycle water back into the plant process.

Sample Collection and Analysis

Sampling Locations. The sampling points for the phossy wastes were the discharge line sampling port between pond 8S recovery process and pond 15S, and ponds 8S, 11S, 12S, 13S, and 15S where grab samples were taken of the sediments. The phossy waste samples from pond 8S recovery process were taken while the unit was operating. The sediment grab samples from the ponds were collected with a pond sampler.

Analytical Method. The samples collected in 1989 were analyzed using the EP toxicity test for the eight RCRA metals: arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver. In addition to metals analysis, the 1989 samples were tested for the hazardous waste characteristics of corrosivity, ignitability, and reactivity. Corrosivity was tested using the EPA test method for pH (Method 5.2) as specified in "Test Methods for the Evaluation of Solid Waste, Physical and Chemical Methods," EPA SW-846, third edition, 1986, and for a liquid that corrodes steel as specified in the National Association of Corrosion Engineers (NACE) Standard TM-01-69 as standardized in EPA SW-846. Ignitability was tested using a Pensky-Martens Closed Cup Tester as specified in ASTM Standard D-3278-78. As discussed in Section C.1.1, the standard laboratory tests for reactivity are not appropriate for the FMC samples.

The samples collected in 1990 were analyzed for the eight metals using the TCLP test.

Analytical Data. A contaminant summary table for phossy wastes is provided in Table C.1.7-2. Analytical data for phossy waste samples collected in November 1989 and September 1990 are presented in Table C.1.7-3. Raw analytical data are provided in Appendix C-6.

None of the samples exceeded the TC regulatory limit, and based on knowledge of plant processes and the generation of this waste stream, FMC has determined that phossy wastes are not hazardous wastes subject to Subtitle C regulation.

Table C.1.7-1
FERROPHOS ANALYTICAL DATA
(all units in mg/L unless otherwise indicated)

Source	Ferrophos	Ferrophos	Toxicity
FMC #	8	9	Characteristic
Lab #	11774-8	11774-9	Regulatory
Analytical Method	EPTOX	EPTOX	Limit
Parameter			
Arsenic	ND	ND	5.0
Barium	0.02	0.05	100.0
Cadmium	ND	ND	1.0
Chromium	ND	ND	5.0
Lead	ND	ND	5.0
Mercury	ND	ND	0.2
Selenium	ND	ND	1.0
Silver	ND	ND	5.0
Hazardous Waste Characteristic			
Corrosivity (pH)	8.0	5.4	≤ 2.0 or ≥12.5 (a)
Ignitability (°F)	>200	>200	<140 (a)

ND: Not detected
(a) Source: 40 CFR Part 261

Table C.1.7-2
PHOSSY WASTES SUMMARY

Parameter	Number of Samples Analyzed	Number of Samples in Which Detected	Frequency of Detection (percent)	Minimum Concentration Detected (mg/L)	Maximum Concentration Detected (mg/L)	FMC # in Which Max. Detected	Arithmetic Mean (mg/L)
Arsenic	11	8	72.7	0.2	0.6	34	0.25
Barium	11	2	18.2	0.02	0.08	8S Process (12592-2)	0.05
Cadmium	11	11	100.0	0.04	0.26	35	0.11
Chromium	11	11	100.0	0.03	1.1	8S Process (12592-6)	0.19
Lead	11	0	0.0	NA	NA	NA	NA
Mercury	11	0	0.0	NA	NA	NA	NA
Selenium	11	0	0.0	NA	NA	NA	NA
Silver	11	0	0.0	NA	NA	NA	NA

NA: Not applicable

Table C.1.7-3
PHOSSY WASTES ANALYTICAL DATA
(All units in mg/L unless otherwise indicated)

Source	8S Process	8S Process	Pond 11S	Pond 12S	Pond 12S	Pond 13S	Pond 13S	Pond 15S	Pond 15S	Pond 8S	Pond 8S	Toxicity Characteristic Regulatory Limit
FMC #	8S Process	8S Process	34	35	36	37	38	39	40	41	42	
Lab #	12952-2	12952-6	11865-2	11865-3	11865-4	11865-5	11865-6	11865-7	11865-8	11865-9	11865-10	
Date Sampled	9/26/90	9/27/90	11/13/89	11/13/89	11/13/89	11/13/89	11/13/89	11/14/89	11/14/89	11/14/89	11/14/89	
Analytical Method	TCLP	TCLP	EP TOX	EP TOX	EP TOX	EP TOX	EP TOX	EP TOX	EP TOX	EP TOX	EP TOX	
Parameter												
Arsenic	0.2	ND	0.60	0.2	0.2	ND	ND	0.2	0.2	0.2	0.2	5.0
Barium	0.08	ND	ND	ND	ND	ND	ND	ND	0.02	ND	ND	100.0
Cadmium	0.05	0.1	0.07	0.26	0.16	0.04	0.04	0.14	0.17	0.07	0.09	1.0
Chromium	0.17	1.1	0.18	0.11	0.07	0.03	0.04	0.14	0.12	0.08	0.05	5.0
Lead	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5.0
Mercury	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.2
Selenium	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.0
Silver	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5.0
Hazardous Waste Characteristic												
Corrosivity (pH)	NA	NA	6.9	6.8	7.1	6.8	6.5	7.9	7.4	7.8	8.0	≤2.0 or ≥12.5 (a)
Corrosivity (NACE) (mm/yr)	NA	NA	0.5	0.1	0.1	0.5	0.8	0.4	0.4	0.4	0.4	6.8 (a)
Ignitability (°F)	NA	NA	>210	>210	>210	>210	>210	>210	>210	>210	>210	<140 (a)
Reactivity	NA	NA	R	R	R	R	R	NR	R	R	R	R (a)

ND: Not detected
NA: Not applicable
NACE: National Association of Corrosion Engineers
R: Reactive
(a) Source: 40 CFR Part 261
TCLP: Toxicity Characteristic Leaching Procedure

C.2 WASTE ANALYSIS PLAN [270.14(b)(3), 264.13(b)]

This waste analysis plan (WAP) provides the guidance and direction for sampling and analysis of the hazardous wastes at FMC's Elemental Phosphorus Plant near Pocatello, Idaho. It meets the requirements of 40 CFR 270.14(b)(3) and 40 CFR 264.13 and is part of FMC's treatment, storage, and disposal facility (TSDF) Part B permit application. The plan describes future sample collection methodology and procedures to be followed as part of FMC's continuing compliance monitoring program.

Section C.1, Chemical and Physical Analysis, summarizes the analytical data necessary to characterize hazardous wastes generated at the facility and meet the requirements of 40 CFR 270.14(b)(2). These data and FMC's knowledge of the process operations have been used to determine the hazardous wastes generated at the facility and are the basis for this plan.

C.2.1 Introduction

The waste analysis plan will be reviewed biennially by the Environmental Engineering Department to ensure that it is accurate, adequate, and revised as appropriate. This review is independent of the future reviews required by 40 CFR 264.13(a)(i), which states that the waste analysis must be repeated when the owner or operator is notified, or has reason to believe, that the process or the operation generating the hazardous waste has changed.

The plan will be document controlled by the Environmental Engineering Department, which will distribute revised pages to holders of each copy for insertion into the plan. Outdated pages will be removed and destroyed. The department will maintain a log of all revisions made to the plan and document records of the biennial reviews/evaluations.

Annual Solid and Hazardous Waste Inventory

A solid and hazardous waste inventory will be prepared annually by the Environmental Engineering Department. The inventory will list the types of wastes generated, transported, stored, treated, managed, or disposed of by the FMC facility. In addition, the inventory will list quantities and ultimate disposition of the wastes, and the companies involved in managing the wastes.

The solid and hazardous waste inventory will be updated by March 30 of each year beginning March in 1992. Hazardous waste information and data from the annual inventory will be used to prepare the biennial hazardous waste report, which is required of permitted facilities and must be submitted to EPA.

C.2.2 Hazardous Waste Streams Monitoring Procedure

The following waste streams were identified to be hazardous wastes on the basis of analytical data obtained from the performance of chemical and physical analyses (Section C.1) These designated waste streams will be monitored for the indicated parameters biennially during the third quarter of odd-numbered years beginning in 1993.

• Used Andersen filter media	8 RCRA metals
• Precipitator slurry	8 RCRA metals
• Furnace Medusa and phos dock scrubber blowdown	8 RCRA metals
• Laboratory solvents, paint solvents, and degreaser solvents	Purgeable aromatics, purgeable halocarbons
• Phossy water (waste water liquor)	8 RCRA metals
• Pond 8S recovery process residue	8 RCRA metals

Samples will be analyzed for the eight RCRA metals using the toxicity characteristic leaching procedure (TCLP).

The waste profiles used to manifest the waste solvents to off-site treatment or disposal facilities will be used in lieu of biennial analysis unless FMC is notified or has reason to believe the constituents or concentrations have changed. A case-by-case determination will be made as to whether the new (changed) waste stream will be analyzed.

C.2.3 Test Methods

Several EPA test methods will be used to analyze the hazardous waste samples. Because the samples contain phosphorus, special procedures will be followed for handling, shipping, and analysis of the samples, for health and safety reasons. Health and safety precautions will take precedence over approved methodologies which would result in the phosphorus being exposed to oxygen. Standard analytical chemistry techniques and procedures will be followed in order to validate the resultant data.

TCLP Metals

Hazardous waste stream samples will be extracted using the TCLP extraction procedure as specified in 40 CFR Part 268, Appendix I (published in Federal Register Vol. 55, No. 149, August 2, 1990). EPA Method 6010 will be used to analyze TCLP extracts for RCRA metals. The toxicity characteristic leaching procedure (TCLP) will be followed on all solid samples and samples containing suspended solids. The leach procedure will be performed on the suspended solids and the leachate combined together with the liquid portion of the sample as specified in the TCLP.

Purgeable Aromatics

EPA Method 8020 will be used to analyze samples of waste solvents for purgeable aromatic compounds. The laboratory will analyze for all parameters in the compound list for EPA Method 8020. Parameters to be analyzed as part of the method are listed in Table C.2.3-1.

Purgeable Halocarbons

EPA Method 8010 will be used to analyze for purgeable halocarbon compounds in waste solvent samples. The laboratory will analyze for all parameters in the compound list for EPA Method 8010. Parameters to be analyzed as part of the method are listed in Table C.2.3-2.

A gas chromatography/mass spectrometry method (EPA Method 8240) may be substituted for the gas chromatography methods (EPA Methods 8010 and 8020) for the analysis of volatile organic compounds such as benzene, toluene, xylene, and trichloroethane. Analytical parameters to be analyzed as part of EPA Method 8240 are listed in Table C.2.3-3.

C.2.4 Sampling Locations and Collection Procedures

This section describes the sampling locations for the hazardous waste streams at the FMC facility. It then describes the procedures for collecting the samples and for using the various containers holding the collected samples. As explained in the footnote on page C-1, special precautions must be taken when dealing with these samples.

The hazardous waste characteristic tests for reactivity and ignitability (flash point) are not designed for a flammable solid like phosphorus. Liquid waste samples containing less than 0.5 percent suspended solids may react when exposed to air. The laboratory judged whether a sample was reactive by exposing the sample to air. If the sample smoked and a visible reaction was observed, the sample contained phosphorus. These samples require special safety precautions and handling.

Although representative samples of FMC hazardous waste streams are very difficult to obtain due to the nature of elemental phosphorus, necessary safety precautions, and variability of production operations, all possible considerations will be taken to obtain meaningful and representative samples as defined in 40 CFR 260.10.

Sampling Locations

Sampling locations for the hazardous waste streams at the FMC facility are described below.

Andersen Filter Media. Samples of used Andersen filter media will be collected from the furnace, the phos dock, and pond 8S recovery process scrubbers while the units are in operation. Andersen filter media samples will be collected from the spent roll before it is removed from the filtering device.

Precipitator Slurry. Precipitator slurry samples will be collected from a sampling port at the west end of the furnace building. If the usual sampling port cannot be opened or no sample flow is observed, the valve located further up on the side of the building may be used. There are several sampling ports in this location.

Precipitator slurry generation is a batch-type operation. Samples will be collected when at least three furnaces are operating in order to get a representative sample.

Medusa Scrubber Blowdown. A 500-gallon tank collects scrubber water blowdown from the Medusa scrubbers. Samples will be collected from the sampling port downstream of the tank. Samples will be collected during furnace operation in order to get a representative sample.

Phos Dock Scrubber Blowdown. The phos dock scrubber blowdown is pumped from the recycle pump sump in the phos dock Andersen scrubber building. A grab sample will be collected from the recycle pump sump. Samples will be collected during scrubber operation and when blowdown is present in the recycle pump sump.

Phossy Water (Process Waste Water Liquor). Waste water liquor samples will be taken from pond 8S and pond 15S. Equal amounts from four separate locations around each pond will be sampled. The four samples from each pond will be composited by FMC to get two representative samples.

Sample Collection Methodology

Sample collection methodology and procedures to be followed for the collection of hazardous waste stream samples at the FMC facility are described below.

Andersen Filter Media. Samples of Andersen filter media will be collected from used filter media from the furnace, the phos dock, and pond 8S recovery process scrubbers while the units are in operation. Andersen filter media samples will be collected from the spent roll before it is removed from the filtering device. Andersen filter media samples will be obtained by cutting an approximately 4 in. by 8 in. block of the filter media from across each roll, one sample from each of the four units in the furnace building, the phos dock, and pond 8S recovery process, for a total of six samples.

Precipitator Slurry. Precipitator slurry generation is a batch-type operation. Samples will be collected when at least three furnaces are operating in order to get a representative sample. The sampling port valve is located outside by the door on the west end of furnace building. If the usual sampling valve cannot be opened or no sample flow is observed, another nearby valve may be used. There are several sampling ports in this location. Any lines will be flushed prior to sample collection. Special safety precautions, including wearing a silver protective suit and face shield and having a second person serve as fire watch, will be required when collecting samples from this port.

Furnace Scrubber Blowdown. Furnace Medusa scrubber blowdown samples will be collected from the sampling port downstream of the scrubber blowdown tank in the furnace building in order to obtain a representative sample. The sampling line and valve must be flushed prior to sample collection. Standard FMC safety equipment will be used and safety precautions followed in the furnace building

Phos Dock Scrubber Blowdown. Phos dock scrubber blowdown samples will be collected from the recycle pump sump in the Andersen scrubber building. A grab sample will be collected from the sump when both the scrubber and the recycle pump are operating and blowdown is present in the sump. Standard FMC safety equipment will be used and precautions followed in the Andersen scrubber building, especially in the phos dock area.

Phossy Water (Waste Water Liquor). A composite of four samples from four separate locations around each pond will be collected. Equal amounts of waste water liquor will be collected from the four locations. The liquor will be composited, and one quarter of the sample sent to the laboratory for analysis. This methodology will be used for ponds 8S and 15S.

Samples of two other process waste water streams located in the slag pit, tiger pits, and slag pit waste water collection sump will also be collected and analyzed. However, the waste water collection sump will be replaced by a tank by September 1, 1991, and the need for sampling will be reevaluated at that time by analyzing samples from the tank.

Sample Containers

The following paragraphs describe the containers to be used for solid samples, liquid samples with no phosphorus, and liquid samples with phosphorus.

Solids. Samples of solid wastes will be collected in wide-mouth glass bottles as close to the source (generation point) as possible. The samples will be collected directly into the bottle, which will be provided by the analytical laboratory. The sample collector will use all proper precautions to prevent contamination of the sample by wearing clean gloves, not allowing the sample to contact any equipment or lines, and flushing the lines before collection in order to obtain a representative sample.

Liquids with No Phosphorus. Samples of liquid wastes that do not contain any phosphorus will be collected in polyethylene bottles as close to the source (generation point) as possible. The samples will be collected directly into bottles provided by the analytical laboratory. If a sample cannot be collected safely because of the sampling location, it may be collected in another container and then transferred to the sample bottle. Containers will be provided by the analytical laboratory and cleaned according to EPA's National Enforcement Investigation Center (NEIC) policies and procedures based on the analytical compounds of interest. The sample collector will use all proper precautions to prevent contamination of the sample by wearing clean gloves, not allowing the sample to contact any equipment or lines, and flushing the lines before collection in order to obtain a representative sample.

Liquids Containing Phosphorus. Samples of liquid wastes containing phosphorus will be collected directly in glass bottles as close to the source (generation point) as possible. The bottles will be provided by the analytical laboratory. If a sample cannot be collected safely because of the sampling location, it may be collected in another glass container and then transferred to the sample bottle. Special safety precautions, such as wearing an aluminum protective suit and face shield and having a second person serve as fire watch, will be required when collecting these samples.

If safety reasons prevent the direct collection of a sample, the sample may be collected initially in a clean large wide-mouth glass jar, cooled for approximately four hours, and then transferred to the sample bottle in the FMC environmental laboratory. The sample collector will use all proper precautions to prevent contamination of the sample by wearing clean gloves, flushing lines before collection, and not allowing the sample to contact any equipment or lines.

C.2.5 Sampling Schedule

Reanalysis

The waste analysis plan will be reviewed biennially to ensure its accuracy. It will be revised as appropriate. FMC will also meet the requirements of 40 CFR 264.13(a)(i), which states that the analysis must be repeated when the owner or operator is notified, or has reason to believe, that the process or the operation generating the hazardous waste has changed. Hazardous waste streams will be sampled both biennially and on a case-by-case basis whenever FMC is notified or has reason to believe that changes in the hazardous waste constituents or characteristics have occurred.

Process or Feedstock Changes

Any substantial change to the processes or feedstocks that could result in a change in the metal constituents or phosphorus concentrations in the waste streams will require that a sample(s) be collected and analyzed for metals and phosphorus. The analysis will be used to verify the adequacy and accuracy of the hazardous waste determinations contained in this plan and the Part B application itself.

Newly Generated or Newly Regulated Wastes

Should hazardous waste regulations be changed or revised in ways that may affect how elemental phosphorus industry wastes are managed, this plan will also be reviewed and revised, if necessary, to comply with new regulations.

C.2.6 Handling and Shipping Procedures

All samples will be packaged and shipped in accordance with Department of Transportation (DOT) Section 173.190 handling and shipping regulations. Samples will be hand packed in a safe manner to prevent unnecessary exposure or risk.

Samples Not Containing Phosphorus

Solid samples will be sealed in the sampling container using a rubberized tape, electrical tape, or equivalent. A chain-of-custody seal will be placed over the tape. The samples will be packed securely in an ice chest. The samples will be cooled to 4°C during storage and prior to shipment. Blue ice or double-bagged ice in sealed baggies will be used to cool the samples during shipment.

Liquid samples will be taped in the sampling container using a rubberized tape, electrical tape, or equivalent. A chain-of-custody seal will be placed over the tape. The samples will be packed securely in an ice chest. The samples will be cooled to 4°C during storage and prior to shipment. Blue ice or double-bagged ice in sealed baggies will be used to cool the samples during shipment.

Samples Containing Phosphorus

The following procedure will be used to determine if the waste sample contains phosphorus. Samples containing phosphorus emit a white smoke when exposed to air. Liquid samples will be carefully stirred or mixed prior to exposure to air. Liquid samples containing phosphorus usually contain suspended solids. Liquid samples containing no suspended solids and showing no signs of visible smoke will be handled and shipped as specified in the section above regarding non-phosphorus-containing liquids.

Samples containing phosphorus can ignite and burn when exposed to air. DOT shipping regulations require special procedures for shipping.

C.2.7 Miscellaneous Items

This section covers the procedures for completing the chain-of-custody forms used when sending samples to the analytical laboratory. It also covers the analytical QA/QC policies and procedures both FMC and the analytical laboratory will follow.

Chain-of-Custody Procedures

Chain-of-custody procedures will be adhered to for all samples collected. Chain-of-custody forms will be properly completed and sent to the analytical laboratory with the samples. A file of the chain-of-custody forms will be maintained in the Environmental Engineering Department records center. Forms will be kept for three years.

Each sample set will be accompanied by a chain-of-custody record supplied by the analytical laboratory.

The chain-of-custody record will be filled out by the sampler with the following data:

- Project Number: Each sampling round will be assigned an unique project number. This number will be generated by the project manager. The last two digits of this number will reflect the year of the sampling round.
- Project Name: Each sampling round will be given an unique project name which reflects the sampling being done.
- Samplers' Signatures: Each chain-of-custody form will be signed by all samplers.
- Firm Name: FMC-Pocatello
- Sample Number: Each sample will be assigned an unique sample number. These numbers should not indicate duplicate samples.
- Date: This is the date the samples were taken.
- Time: This is the time the samples were taken, expressed in Military Time.
- COMP/GRAB: A check will be placed in the appropriate column indicating whether a sample is a composite or a grab.
- Station Location: This is a brief description of where the sample was taken. It will be specific enough for an outside auditor to generally identify the location.

- Number of Containers: This is the number of containers for the unique sample number.
- Analysis Requested: This is the analytical test to be done on the sample. It must be specific.
- Comments: This should be used to note any special properties or circumstances which could affect analytical results. It can also be used for general comments.
- Relinquished by: (Signature): The sampler must sign in the Relinquish box. If the sampler is also packing the samples for shipment, he will also fill in Means of Delivery. Time of pickup will be indicated in the Remarks box.

  If the sampler gives the samples to someone not involved in the sampling, he/she must sign the relinquish box and the packer must sign in the Received box. Means of Delivery will be "by hand."

  The receiver will then pack the samples, sign the next relinquish box, and fill in the means of delivery. The time of pickup will be indicated in the Remarks column.

When the chain-of-custody form is completed, the pink copy will be removed and returned to the project manager. The remaining two copies will be placed in a watertight baggie and taped to the inside of the packing crate lid.

After proper packaging for shipment, a chain-of-custody seal will be placed around the openings of the package to prevent tampering.

When the yellow copy of the chain-of-custody form is returned from the analytical laboratory with the analytical data, the pink copy will be attached to the yellow copy and filed with the data.

<u>QA/QC Policies and Procedures</u>

FMC and the analytical laboratory will follow accepted EPA analytical QA/QC policies and procedures. Both field and laboratory quality control (QC) checks will be employed to evaluate the performance of laboratory analytical procedures. FMC will follow proper procedures and collect the appropriate number of blanks, duplicates, etc. to ensure adequate quality control. The analytical laboratory will also use acceptable quality control checks.

<u>Field QC Checks.</u>

- Duplicates. One duplicate sample will be collected and submitted to the laboratory for analysis for every 10 samples collected. The duplicate will be analyzed for the same parameters as the sample that is duplicated.

Laboratory QC Checks.

- Matrix Spike/Matrix Spike Duplicate. The laboratory will analyze one matrix spike and one matrix spike duplicate for every 10 samples submitted for analyses.
- Calibration of Instruments. The laboratory will calibrate instruments as described in and at the frequency prescribed in the analytical methods used and in the instrument manufacturer's instructions.
- Analysis of Standards. The laboratory will analyze standards for each analytical method at the start of each laboratory shift or as prescribed in the analytical methods.
- Analysis of Blanks. The laboratory will analyze one laboratory blank for every 10 samples analyzed by each analytical method, or one per batch, whichever is greater.

FMC Audits. Internal audits will be conducted annually to ensure that the waste analysis plan is being implemented and that documentation is available to verify that the plan is being followed.

Analytical Laboratory Audits. Audits of the analytical laboratory analyzing the FMC waste will be performed as necessary to ensure the accuracy of the chemical analysis. The audits will be conducted by FMC or its authorized representative. The audits will be scheduled during or immediately following the analysis of a group of FMC samples.

Sample Containers and Preservatives. Samples will be collected for analysis in sample containers that contain the preservatives required for the analytical method to be tested. Sample containers and preservatives required for samples and the analytical methods to be tested are listed below:

- TCLP Metals (EPA 6010) - Unpreserved polyethylene or glass bottle cooled to 4°C

Holding Times. Laboratory holding times specified in SW-846, "Test Methods for Evaluating Solid Waste," third edition, EPA 1986, will be followed and verified from results to ensure that the laboratory does not exceed the prescribed holding time for a particular analysis. FMC samples will be forwarded to the laboratory for analysis within twenty-four hours after collection.

The holding time specified for the analytical parameters to be tested is as follows:

- Metals (EPA 6010) - 6 months

Table C.2.3-1

PURGEABLE AROMATIC COMPOUND (EPA METHOD 8020) ANALYTICAL PARAMETERS

Benzene	Chlorobenzene
1,2-Dichlorobenzene	1,3-Dichlorobenzene
1,4-Dichlorobenzene	Ethylbenzene
Toluene	Xylenes

Table C.2.3-2
PURGEABLE HALOCARBON COMPOUNDS (EPA METHOD 8010) ANALYTICAL PARAMETERS

Bromodichloromethane	Bromoform
Bromomethane	Carbon Tetrachloride
Chlorobenzene	Chloroethane
2-Chloroethylvinyl Ether	Chloroform
Chloromethane	Dibromochloromethane
1,2-Dichlorobenzene	1,3-Dichlorobenzene
1,4-Dichlorobenzene	1,1-Dichloroethane
1,2-Dichloroethane	1,1-Dichloroethene
trans-1,2-Dichloroethene	1,2-Dichloropropane
cis-1,2-Dichloropropene	trans-1,3-Dichloropropene
Methylene Chloride	1,1,2,2-Tetrachloroethane
1,1,1-Trichloroethane	1,1,2-Trichloroethane
Trichloroethene	Trichlorofluoromethane
Vinyl Chloride	

Table C.2.3-3

VOLATILE ORGANIC COMPOUNDS (EPA METHOD 8240) ANALYTICAL PARAMETERS

Acetone
Acrolein
Benzene
Bromoacetone
Bromoform
2-Butanone
Carbon Tetrachloride
Chlorodibromomethane
2-Chloroethanol
Chloroform
1,2-Dibromo-3-chloropropane
Dibromomethane
Dichlorodifluoromethane
1,2-Dichloroethane
trans-1,2-Dichloroethene
1,3-Dichloro-2-propanol
cis-1,2-Dichloropropene
1,4-Dioxane
Ethylbenzene
Iodomethane
Methylene Chloride
Pentachloroethane
1,1,1,2-Tetrachloroethane
Tetrachloroethene
1,2,3-Trichlorobenzene
1,1,1-Trichloroethane
Trichloroethene
1,2,3-Trichloropropane
1,3,5-Trimethylbenzene
o-Xylene
p-Xylene
m-Xylene

Acetonitrile
Acrylonitrile
Benzyl Chloride
Bromodichloromethane
Bromomethane
Carbon Disulfide
Chlorobenzene
Chloroethane
2-Chloroethyl Vinyl Ether
Chloromethane
1,2-Dibromoethane
1,4-Dichloro-2-butene
1,1-Dichloroethane
1,1-Dichloroethene
1,2-Dichloropropane
cis-1.3-Dichloro-2-propanol
trans-1.3-Dichloropropene
Ethanol
2-Hexanone
Isobutyl Alcohol
4-Methyl-2-pentanone
Pyridine
1,1,2,2-Tetrachloroethane
Toluene
1,2,4-Trichlorobenzene
1,1,2-Trichloroethane
Trichlorofluoromethane
1,2,4-Trimethylbenzene
Vinyl Chloride

C.3 LAND DISPOSAL RESTRICTIONS [40 CFR 268]

Of the six waste streams identified by FMC as subject to Subtitle C regulations, five are mineral processing wastes and are "newly identified" wastes with respect to RCRA. As specified in 55 FR 22530 and 22667, newly identified mineral processing wastes are not subject to land disposal restrictions at this time or to best demonstrated available technology (BDAT) treatment standards. Therefore, this application does not specify any restrictions or treatment procedures for the newly identified wastes. If and when the EPA specifies land disposal restrictions and treatment standards for these wastes, the Part B application (or permit) will be amended.

The single waste stream that is not a newly identified mineral processing waste is the waste solvent that FMC generates. FMC, as a generator, has handled and will continue to handle this waste stream by manifesting the waste to an approved RCRA disposal facility. As the solvent wastes are either recycled or incinerated, there is no need for FMC to designate land disposal treatment standards for the recipient of the waste.

<u>Off-site Wastes</u>

FMC is considering treating and disposing of hazardous waste from its burning plants at the Pocatello facility. If and when this decision is made, this section will be amended to include the land disposal restrictions and corresponding treatment standards applicable for all hazardous constituents of the wastes.

C.4 MANIFESTING AND RECORDKEEPING [262.20]

C.4.1 Generator Standards

RCRA regulations in 40 CFR 262 establish standards for generators of hazardous waste. As a generator of hazardous wastes, FMC is required to follow these standards for accumulating wastes, preparing wastes for shipment, preparing uniform hazardous waste manifests, and recordkeeping. Following is a detailing of the procedures for handling and disposing of FMC's various waste streams.

Waste Solvents

Chlorinated Solvent. This cleaning solvent waste comes from parts washing and is composed of 50 percent oil, 40 percent 1,1,1-trichloroethane, and 10 percent methylene chloride. The spent solvent is accumulated in DOE 17E closed-top unlined 55-gallon steel drums, labeled appropriately. The metal drums are sent to an approved RCRA disposal facility by a registered hauler. These shipments are manifested by FMC according to the requirements of 40 CFR 262.20.

Laboratory Liquid Organics. This waste stream comes from the on-site analytical laboratory and is composed of 75 percent toluene (D001), 20 percent xylene (F003), and 5 percent benzene (F005), and trace amounts of phosphorus. It is accumulated in metal drums, labeled appropriately. The organic waste is sent to an approved RCRA disposal facility by a registered hauler. These shipments are manifested by FMC according to the requirements of 40 CFR 262.20.

Lab Packs. Three separate lab pack waste streams originate from the analytical laboratory: corrosive (D002), non-organic (D001, D005, D008), and flammable (D001). The wastes are packaged in 35-gallon drums and sent to an approved disposal facility by a registered hauler. The waste shipments are manifested by FMC according to the requirements of 40 CFR 262.20.

Safety-Kleen Solvent. This cleaning solvent waste comes from parts washing and is composed of 90 percent naphtha, 5 percent oil, and 5 percent dirt. The spent solvent is packaged in metal drums and sent for recycling to Safety-Kleen Corporation in Pocatello, Idaho. These waste shipments are manifested by FMC according to the requirements of 40 CFR 262.20.

Precipitator Slurry/Dust

This solid waste stream, hazardous because of the leachable cadmium, comes from the electrostatic precipitators on the furnaces; it is composed of 60 percent dirt, 30 percent water, and varying amounts of phosphorus. The solids from the precipitator are slurried and pumped to an interim storage pond (8E) on site. The pond is dredged seasonally and the solids are transported to the evaporation pond 9E and air-dried in a batch process. When dry, the solids are stockpiled on-site in area 9S.

Phossy Water (Waste Water Liquor)

This waste stream is water containing dissolved and suspended solids including phosphorus. This liquor is contained in ponds 8S and 15S.

Furnace Scrubber Blowdown

This is a liquid waste stream that comes from the Medusa wet scrubbers on the furnaces. The wastes are routed to the waste water treatment plant for treatment prior to discharge to the calciner ponds.

Phos Dock Scrubber Blowdown

This liquid waste stream comes off the Andersen scrubber on the phos dock. It is routed to the Phase IV ponds.

Andersen Filter Media

Andersen filter media is used in the Andersen scrubbers in the furnace building, the phos dock, and the pond 8S recovery process. It is composed of 95 percent glass fiber, 5 percent phosphoric acid and dirt, and is hazardous because of the leachable cadmium. There are two satellite storage areas within the furnace building where the rolls of filter media are temporarily stored. Filter media is then transferred, at the end of each shift, to 20-cubic-yard gondolas in WMU #2. The used Andersen filter media from the phos dock and pond 8S recovery process is also transferred to WMU #2. The gondolas are labeled with removable placards as containing a "miscellaneous" waste. The gondolas are manifested off-site to a RCRA permitted disposal facility. The waste is manifested by FMC according to the requirements of 40 CFR 262.20.

C.4.2 Manifests

For proper and responsible handling of wastes, the FMC facility maintains complete records and manifests on wastes that are sent off-site. On-site wastes are not manifested. However, records are kept based on past knowledge and current production rates.

FMC uses the Uniform Hazardous Waste Manifest, and all manifests are prepared and signed by a facility environmental engineer. One copy is kept at the facility and the rest are given to the transporter. The copy received from the designated disposal facility is matched with the retained copy and both are kept on-site for a period of at least three years.

C.4.3 Recordkeeping

Pursuant to 40 CFR 264.73 (b) and company policy, an operating record of the facility is maintained by the Environmental Engineering Department and is kept on-site in the form of files and log books. The operating record includes at least the following information:

- A description of each hazardous waste, and the method of its treatment, storage, and/or disposal
- The date of treatment, storage, and/or disposal
- The location of each hazardous waste within the facility and an estimated inventory for each waste
- Records and results of waste analyses
- CERCLA reportable quantities
- Records and results of inspections (these data need be kept at least three years)
- Monitoring, testing, or analytical data
- All closure cost estimates and post-closure cost estimates

The record also includes the annual certification required by the waste minimization program. That certification states: the generator has in place a program to reduce the volume and toxicity of waste generated to the degree economically practicable and has selected the practicable method of treatment, storage, or disposal currently available which minimizes the present and future threat to human health and the environment.

C.4.4 Reports

This section discusses reports to be submitted to EPA.

Biennial Report

Due to its exclusion as a small quantity generator, FMC has not been required to submit biennial reports to date. However, as a generator of hazardous waste, a biennial report will be submitted to the EPA Regional Administrator by March 1 of each even-numbered year, beginning in 1992. The biennial report will be submitted on EPA Form 8700-13A; it will cover FMC's waste activities during the previous calendar year and will include the information required in 40 CFR 262.41. As an operating treatment, storage, and disposal facility, FMC will submit a biennial report on EPA Form 8700-13B; it will cover facility activities for the previous calendar year and will include the information required of an on-site facility in 40 CFR 264.75.

Manifest Exception Report

If FMC does not receive a copy of the manifest from a waste shipment with the handwritten signature of the owner or operator of the designated facility within 35 days of the date the waste is accepted by the initial transporter, FMC will contact the transporter and the owner or operator of the designated facility to determine the status of the waste. If FMC still has not received a copy of the manifest from the designated facility within 45 days, an exception report will be submitted to the EPA Regional Administrator. The exception report will include:

- A copy of the manifest for which FMC does not have confirmation of delivery
- A cover letter signed by FMC explaining the efforts taken to locate the waste and the results of those efforts

Others

Pursuant to 40 CFR 264.77, FMC will also report:

- Releases, major fires and explosions [264.56(j)]
- Facility closures [264.115]
- Contamination from a non-regulated unit [264.98(g)(6)(ii) and 264.99(i)(2)]
- Effectiveness of the the corrective action program [264.100(g)]
- As otherwise may be required by 40 CFR 264 Subparts K, L, and X

C.5 WASTE MINIMIZATION PROGRAM

The following describes the FMC waste minimization program.

C.5.1 Policy

It is FMC Corporation's General Policy to conduct its business in a manner that safeguards public health and the environment, and in so doing comply with all applicable laws and regulations (R. N. Burt, Worldwide Policies on Health, Safety, and the Environment, FMC Executive Offices, January 7, 1991).

Specific policy concerning solid wastes include:

- Design and operate facilities to minimize the amount of wastes generated.
- Recycle or reuse as much wastes generated as feasible.
- Treat or destroy wastes not recyclable or reusable to the extent feasible.
- Manage wastes for which no alternative but land disposal exists to minimize liability.

C.5.2 Discussion and Purpose

The primary focus of this waste minimization program is on hazardous wastes, as defined in the Resource Conservation and Recovery Act (RCRA). It is the purpose of this program to establish the identity and quantity of hazardous wastes generated at the FMC facility and to identify active projects or activities that contribute to the facility's waste minimization effort.

Waste minimization includes the reduction, to the extent feasible, of hazardous waste that is generated or subsequently treated, stored, or disposed of. It includes any source reduction or recycling activity undertaken that results in either (1) the reduction of total volume or quantity of hazardous waste, or (2) the reduction of toxicity of the hazardous waste, or both, so long as such reduction is consistent with the goal of minimizing present and future threats to human health and the environment.

Waste minimization is a policy specifically mandated by the U.S. Congress in the 1984 Hazardous and Solid Wastes Amendments to RCRA. Specifically, 40 CFR 265.75, Biennial Report, paragraphs (h) and (i) requires a "description of the efforts undertaken during the year to reduce the volume and toxicity of waste generated," and "a description of the changes in volume and toxicity of waste actually achieved. . . ."

This program has been developed to satisfy the requirements of the certification on the Uniform Hazardous Waste Manifest, EPA Form 8700-22, This program has been developed to satisfy the requirements of the certification on the Uniform Hazardous Waste Manifest, EPA Form 8700-22, which states that "I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment. . . ."

The suggested format for a waste minimization program is provided in EPA Waste Minimization Opportunity Assessment Manual (EPA/625/7-88/003). This manual has been used as a guide in the preparation of this program and is a recommended reference document for further waste minimization efforts.

C.5.3 Hazardous Wastes

Waste management units (WMUs) have been defined to identify each hazardous waste area and to establish proper management procedures. The wastes included in each unit are:

WMU #1	-	Spent laboratory, degreasing, and paint solvents
WMU #2	-	Used Andersen filter media
WMU #3	-	Pond 15S waste water liquor
WMU #4	-	Treatment unit (no wastes)
WMU #5	-	Slag pit phossy water and sludges
WMU #6	-	Precipitator dust (stockpile in area 9S)
WMU #7	-	Pond 8S waste water liquor
WMU #8	-	Waste water liquor
WMU #9	-	Precipitator dust in drying pond 9E
WMU #10	-	Proposed pond 16S waste water liquor
WMU #11	-	Pond 8E precipitator slurry
WMU #12	-	Treatment unit (no wastes)

Waste data for these units are provided in Table C.5.3-1.

C.5.4 Implementation

The current projects and activities described below have been identified for their contribution to the plant's waste minimization efforts.

Hazardous Waste: DEGREASING SOLVENTS

Project /Activity: Handling methods procedures

Objective: Minimize use through proper procedures, protect the environment by containing vapors, and recycle and reuse solvents by returning spent solvents to the supplier

Discussion: The procedures are now in use. They include a) safe degreaser work practices, b) requisition procedure of degreaser from Stores, c) set up of accumulation stations for waste degreaser, d) accountability of degreaser usage, e) monitoring of accumulation station and f) return of spent solvents to the supplier.

Plant contact: Dave Buttelman

Hazardous Waste: SLAG PIT WASTE

Project/Activity: Reduction of slag pit emission

Objective: Eliminate phosphorus-contaminated water from entering the slag pit. Reduce P_2O_5 emissions and the potential for groundwater contamination

Discussion: This major project involves an expenditure of approximately $5.3 million and is currently underway. This project will install new equipment, improve existing equipment, and revise operating procedures in order to eliminate phossy water from entering the furnace slag pit. The project will, at the same time, reduce contamination in the waste water stream through improvements and changes in precipitator slurry handling, waste water collection, and furnace and phos dock water balance control. The scheduled completion of the project is 9/1/91, with partial completion of the collection systems on two furnaces by 12/1/90.

Plant contact: Bob Hart

Hazardous Waste: ANDERSEN FILTER MEDIA

Project/Activity: Changing disposal method from on-site landfill to off-site landfill

Objective: Protect worker environment by improved handling methods and elimination of the need for an on-site hazardous waste landfill

Discussion: This completed project has successfully eliminated the need for an on-site hazardous waste landfill. Used filter media is now accumulated in covered shipping containers at a holding area and routinely transported to an off-site facility for disposal.

Plant contact: Pam French

Hazardous Waste: ANDERSEN FILTER MEDIA

Project/Activity: Filter media procedures

Objective: Reduce wastage and develop safe handling procedures

Discussion: Improved handling procedures are being developed to ensure that the used filter media is handled in a consistent and environmentally sound manner. Plastic bag wraps are currently being tested. Recycling is under study through a washing and reuse concept. Alternately, washing may render the filter media non-hazardous for safe disposal.

Plant contact: Jerry Howell

Hazardous Waste: PHOSSY WASTE SOLIDS

Project/Activity: Minimization of phosphorus in the waste stream

Objective: Control losses of phosphorus into the phossy water

Discussion: An automatic sampling system with 12-hour composite samples of phossy water from the phos dock is operational. The samples collected from automatic sampling provide data on the phosphorus and dirt solids being wasted. If results show phosphorus losses too high, the hydroclones are checked and corrective actions are taken.

Plant Contact: Willard Larson

Hazardous Waste: FURNACE OFF-GAS SOLIDS

Project/Activity: Air-classification that removes -6 mesh coke and nodule dust from the furnace burden

Objective: Reduce the amount of furnace off-gas solids generated and reduce the amount of phossy sludge generated

Discussion: This project will extract fine particles from the burden system. The collected dust will be recycled to the shale handling system for reprocessing into briquettes.

Plant contact: Russ Patton

Hazardous Waste: PRECIPITATOR DUST SOLIDS

Project/Activity: Precipitator dust byproduct study

Objective: Convert the dust into a valuable byproduct and/or a non-hazardous waste

Discussion: This new project assignment will provide information on the proper management of potentially valuable dust as a byproduct or recyclable material.

Plant contact: Bill Fyock (Princeton)

Hazardous Waste: POND 8S SOLIDS

Project/Activity: Pond 8S recovery process

Objective: Reclaim phosphorus from pond solids and transfer unrecoverable solids to a lined pond

Discussion: This is an active process that recovers approximately 5 million pounds of product per year and at the same time removes hazardous materials from an old unlined pond. The pond, when emptied, will be properly closed.

Plant contact: Kevin Bradburn

Hazardous and Solid Wastes: ALL

Project/Activity: Annual hazardous and solid waste inventory

Objective: Reduce generation of wastes.

Discussion: This inventory is used as a management tool to determine the success of waste reduction programs and to define needed projects for further improvements.

Plant contact: Pam French

C.5.5 Future Waste Minimization Assessments

This program will be reviewed annually to determine the progress being made towards the overall goal of waste minimization. New or additional projects will be done as required.

Table C.5.3-1
SUMMARY OF HAZARDOUS WASTE DATA – WASTE MINIMIZATION

Mgmt. Unit	Waste Description	Annual Qnty, t (a)	EP Toxicity Characteristic	Ep Toxicity, mg/L (b)	Inventory Waste, t	Capacity Design, Full (c)	Tons 3-1-90 Remaining
1	Spent lab solvents		Toluene Reactive Ignitable Solvents				
	Waste paint solvents		Solvents				
	Spent degreasing solvents		Solvents				
	Subtotal	4		N/A*	unk.**	39	39
2	Andersen filter media	50	Cadmium Arsenic	6.8 11.0	unk.	6	unk.
3	(15S) Phossy waste solids	36,000	—	N/A	115,000	193,390	75,751
	Waste water liquor	Included	Cadmium	2.0			
4	Slag pit waste water	120,000	Cadmium	N/A	unk.	500	unk.
5	(9S) Precipitator dust (stockpile)	14,000	Cadmium	5.9	unk.	21,000	unk.
6	(8S) Waste water liquor	N/A	Cadmium	N/A			44,839 tons
7	11S, 12S, 13S, 14S	N/A	—	N/A	unk.	90,784	unk.
8	(9E) Precipitator dust (drying pond)	N/A	Cadmium	2.2	unk.	77,482	unk.
9	Proposed (16S) waste water liquor	N/A	—	unk. unk.	0	210,031	N/A Planned
11	(8E) Precipitator slurry (settling pond)	N/A	Cadmium	N/A unk.	unk.	34,283	unk.
12	Furnace scrubber blowdown	218,000	Cadmium	1.5	N/A	218 Ktpy	N/A
	Totals	396,554					

(a) Annual quantity of hazardous waste generated was reported in Part A, Hazardous Waste Permit Appl. dated 3-1-90 at 178,554 tons. Management units #8 through #12 were added since that report.

(b) EP Toxicity analytical results per Analytica Inc. Samples collected Nov. and Dec. of 1989.

(c) Pond capacity calculations per Reeve & Associates, 9/26/90.

* N/A: Not applicable **unk.: Data is unknown or not available.

C.1 Chemical and Physical Analyses

C.2 Waste Analysis Plan

C.3 Land Disposal Restrictions

C.4 Manifesting and Recordkeeping

C.5 Waste Minimization Plan

Appendices

Appendix C-1

Raw Analytical Data – Andersen Filter Media

ANALYTICA
—I-N-C-O-R-P-O-R-A-T-E-D—

ANALYTICAL RESULTS

FOR

FMC

Client ID: F-1; Andersen Filter-Furnace #1
Analytica ID: 13220-1

Date Sampled: 11-15-90
Date Received: 11-19-90

TCLP Metals	Units	Concentration	
Arsenic	mg/L	2.5	(0.4)
Barium	mg/L	0.18	(0.08)
Cadmium	mg/L	36	(0.04)
Chromium	mg/L	1.6	(0.08)
Lead	mg/L	ND	(0.2)
Mercury	mg/L	ND	(0.002)
Selenium	mg/L	ND	(0.4)
Silver	mg/L	ND	(0.04)

ND = Not Detected
Detection Limits in Parentheses

ANALYTICA
—I-N-C-O-R-P-O-R-A-T-E-D—

ANALYTICAL RESULTS

FOR

FMC

Client ID: F-2; Andersen Filter-Furnace #2
Analytica ID: 13220-2

Date Sampled: 11-15-90
Date Received: 11-19-90

TCLP Metals	Units	Concentration	
Arsenic	mg/L	4	(1)
Barium	mg/L	ND	(0.2)
Cadmium	mg/L	42	(0.1)
Chromium	mg/L	1.6	(0.2)
Lead	mg/L	ND	(0.5)
Mercury	mg/L	ND	(0.002)
Selenium	mg/L	1.0	(0.4)
Silver	mg/L	ND	(0.1)

ND = Not Detected
Detection Limits in Parentheses

ANALYTICA
—I-N-C-O-R-P-O-R-A-T-E-D—

ANALYTICAL RESULTS

FOR

FMC

Client ID: F-3; Andersen Filter-Furnace #3
Analytica ID: 13220-3

Date Sampled: 11-15-90
Date Received: 11-19-90

TCLP Metals	Units	Concentration	
Arsenic	mg/L	1.7	(0.2)
Barium	mg/L	0.12	(0.04)
Cadmium	mg/L	2.0	(0.02)
Chromium	mg/L	2.3	(0.04)
Lead	mg/L	ND	(0.1)
Mercury	mg/L	ND	(0.002)
Selenium	mg/L	0.3	(0.2)
Silver	mg/L	ND	(0.02)

ND = Not Detected
Detection Limits in Parentheses

ANALYTICA
INCORPORATED

ANALYTICAL RESULTS

FOR

FMC

Client ID: F-4; Andersen Filter-Furnace #4
Analytica ID: 13220-4

Date Sampled: 11-15-90
Date Received: 11-19-90

TCLP Metals	Units	Concentration	
Arsenic	mg/L	26	(0.2)
Barium	mg/L	0.18	(0.04)
Cadmium	mg/L	20	(0.02)
Chromium	mg/L	1.0	(0.04)
Lead	mg/L	0.1	(0.1)
Mercury	mg/L	ND	(0.002)
Selenium	mg/L	ND	(0.2)
Silver	mg/L	ND	(0.02)

ND = Not Detected
Detection Limits in Parentheses

ANALYTICA
—I-N-C-O-R-P-O-R-A-T-E-D—

QUALITY CONTROL SUMMARY

DUPLICATE ANALYSIS

LGN: 13220

TCLP Metals	Units	Sample		Duplicate		Relative Percent Difference
Arsenic	mg/L	1.7	(0.2)	1.7	(0.2)	0
Barium	mg/L	0.12	(0.04)	0.12	(0.04)	NC
Cadmium	mg/L	2.0	(0.02)	2.1	(0.02)	4.9
Chromium	mg/L	2.3	(0.04)	2.4	(0.04)	4.3
Lead	mg/L	ND	(0.1)	ND	(0.1)	NC
Mercury	mg/L	ND	(0.002)	ND	(0.002)	NC
Selenium	mg/L	0.3	(0.02)	0.3	(0.2)	NC
Silver	mg/L	ND	(0.02)	ND	(0.02)	NC

NC = Not Calculated
ND = Not Detected
Detection Limits in Parentheses

ANALYTICA
—I-N-C-O-R-P-O-R-A-T-E-D—

QUALITY CONTROL SUMMARY

SPIKE ANALYSIS

LGN: 13220

TCLP Metals	Units	Sample Result		Spike Result	Spike Added	Percent Recovery
Arsenic	mg/L	26	(0.2)	30	4.0	NC
Barium	mg/L	0.18	(0.04)	1.2	1.0	102
Cadmium	mg/L	20	(0.02)	21	1.0	NC
Chromium	mg/L	1.0	(0.04)	2.1	1.0	110
Lead	mg/L	0.1	(0.1)	1.2	1.0	110
Mercury	mg/L	ND	(0.002)	0.010	0.010	100
Selenium	mg/L	ND	(0.2)	4.3	4.0	108
Silver	mg/L	ND	(0.02)	0.12	0.10	120

NC = Not Calculated
ND = Not Detected
Detection Limits in Parentheses

ANALYTICA
—I-N-C-O-R-P-O-R-A-T-E-D—

QUALITY CONTROL SUMMARY

LABORATORY CONTROL SAMPLE

LGN: 13220

TCLP Metals	Units	True Value	Found Value	Percent Recovery	Control Limits
Arsenic	mg/L	2.0	1.9	95	80-120
Barium	mg/L	0.50	0.50	100	80-120
Cadmium	mg/L	0.50	0.48	96	80-120
Chromium	mg/L	0.50	0.48	96	80-120
Lead	mg/L	0.50	0.50	100	80-120
Mercury	mg/L	0.0050	0.0045	90	80-120
Selenium	mg/L	2.0	1.9	95	80-120
Silver	mg/L	0.05	0.05	100	80-120

ANALYTICA
—I-N-C-O-R-P-O-R-A-T-E-D—

ANALYTICAL RESULTS

FOR

FMC CORPORATION

Client ID:	Stat. No. 94		Stat. No. 95	
Analytica ID:	12457-1		12457-2	
TCLP Metals, mg/L	Concentration		Concentration	
Arsenic	2.1	(0.2)	1.3	(0.2)
Barium	0.09	(0.04)	0.11	(0.04)
Cadmium	1.4	(0.02)	0.90	(0.02)
Chromium	0.67	(0.04)	0.99	(0.04)
Lead	0.2	(0.1)	ND	(0.1)
Mercury	ND	(0.002)	ND	(0.002)
Selenium	ND	(0.2)	ND	(0.2)
Silver	ND	(0.02)	ND	(0.02)
Inorganic Parameters				
Corrosivity, pH Units	1.6		1.6	
Cyanide, Reactive, mg/kg	ND	(1.5)	ND	(1.5)
Ignitability, Degrees F	135		135	
Sulfide, Reactive, mg/kg	ND	(100)	ND	(100)

ND = Not Detected
Detection Limits in Parentheses

ANALYTICA
INCORPORATED

ANALYTICAL RESULTS

FOR

FMC CORPORATION

Client ID:	Stat. No. 96		Stat. No. 97	
Analytica ID:	12457-3		12457-4	
TCLP Metals, mg/L	**Concentration**		**Concentration**	
Arsenic	1.9	(0.2)	1.7	(0.2)
Barium	0.05	(0.04)	0.07	(0.04)
Cadmium	0.85	(0.02)	0.69	(0.02)
Chromium	0.70	(0.04)	0.67	(0.04)
Lead	0.1	(0.1)	0.2	(0.1)
Mercury	ND	(0.002)	ND	(0.002)
Selenium	ND	(0.2)	ND	(0.2)
Silver	ND	(0.02)	ND	(0.02)

Inorganic Parameters

Corrosivity, pH Units	1.4		1.4	
Cyanide, Reactive, mg/kg	ND	(1.5)	ND	(1.5)
Ignitability, Degrees F	116		114	
Sulfide, Reactive, mg/kg	ND	(200)	ND	(100)

ND = Not Detected
Detection Limits in Parentheses

ANALYTICA
INCORPORATED

ANALYTICAL RESULTS

FOR

FMC CORPORATION

Client ID:	Stat. No. 98		Stat. No. 99	
Analytica ID:	12457-5		12457-6	
TCLP Metals, mg/L	Concentration		Concentration	
Arsenic	ND	(0.2)	0.3	(0.2)
Barium	ND	(0.04)	ND	(0.04)
Cadmium	2.3	(0.02)	1.3	(0.02)
Chromium	0.46	(0.04)	0.35	(0.04)
Lead	ND	(0.1)	ND	(0.1)
Mercury	ND	(0.002)	ND	(0.002)
Selenium	ND	(0.2)	ND	(0.2)
Silver	ND	(0.02)	ND	(0.02)

Inorganic Parameters

Corrosivity, pH Units	1.3		1.4	
Cyanide, Reactive, mg/kg	ND	(1.5)	ND	(1.5)
Ignitability, Degrees F	No Flash to 215		No Flash to 215	
Sulfide, Reactive, mg/kg	ND	(200)	ND	(100)

ND = Not Detected
Detection Limits in Parentheses

ANALYTICA
—I-N-C-O-R-P-O-R-A-T-E-D—

ANALYTICAL RESULTS

FOR

FMC CORPORATION

Client ID:	Stat. No. 100	Stat. No. 101
Analytica ID:	12457-7	12457-8

TCLP Metals, mg/L	Concentration		Concentration	
Arsenic	0.5	(0.2)	3.3	(0.2)
Barium	ND	(0.04)	ND	(0.04)
Cadmium	0.47	(0.02)	0.53	(0.02)
Chromium	0.19	(0.04)	0.22	(0.04)
Lead	ND	(0.1)	ND	(0.1)
Mercury	ND	(0.002)	ND	(0.002)
Selenium	ND	(0.2)	ND	(0.2)
Silver	ND	(0.02)	ND	(0.02)

Inorganic Parameters				
Corrosivity, pH Units	2.4		1.9	
Cyanide, Reactive, mg/kg	ND	(1.5)	ND	(1.5)
Ignitability, Degrees F	No Flash to 215		No Flash to 215	
Sulfide, Reactive, mg/kg	ND	(200)	ND	(100)

ND = Not Detected
Detection Limits in Parentheses

ANALYTICA
INCORPORATED

QUALITY CONTROL SUMMARY

DUPLICATE ANALYSIS

LGN: 12457

TCLP Metals, mg/L	Sample		Duplicate		Relative Percent Difference
Arsenic	ND	(0.2)	ND	(0.2)	NC
Barium	ND	(0.04)	ND	(0.04)	NC
Cadmium	2.3	(0.02)	2.3	(0.02)	0.0
Chromium	0.46	(0.04)	0.45	(0.04)	2.2
Lead	ND	(0.1)	ND	(0.1)	NC
Mercury	ND	(0.002)	ND	(0.002)	NC
Selenium	ND	(0.2)	ND	(0.2)	NC
Silver	ND	(0.02)	ND	(0.02)	NC
Inorganic Parameters					
Corrosivity, pH Units	1.9		1.9		0.0
Cyanide, mg/kg Reactive	ND	(1.5)	ND	(1.5)	NC
Ignitability, Degrees F	No Flash to 215		No Flash to 215		NC
Sulfide, mg/kg Reactive	ND	(100)	ND	(200)	NC

NC = Not Calculated
ND = Not Detected
Detection Limits in Parentheses

ANALYTICA
—I-N-C-O-R-P-O-R-A-T-E-D—

QUALITY CONTROL SUMMARY

SPIKE ANALYSIS

LGN: 12457

TCLP Metals, mg/L	Sample Result		Spike Result	Spike Added	Percent Recovery
Arsenic	0.3	(0.2)	1.2	1.0	90
Barium	ND	(0.04)	1.1	1.0	110
Cadmium	1.3	(0.02)	2.3	1.0	100
Chromium	0.35	(0.04)	1.5	1.0	115
Lead	ND	(0.1)	1.0	1.0	100
Mercury	ND	(0.002)	0.009	0.010	90
Selenium	ND	(0.2)	0.9	1.0	90
Silver	ND	(0.02)	1.0	1.0	100
Inorganic Parameters					
Cyanide, Reactive mg/kg	ND	(1.5)	21	1000	2.1
Sulfide, Reactive mg/kg	ND	(100)	400	1000	40

ND = Not Detected
Detection Limits in Parentheses

ANALYTICA
—I-N-C-O-R-P-O-R-A-T-E-D—

QUALITY CONTROL SUMMARY

LABORATORY CONTROL SAMPLE

LGN: 12457

TCLP Metals, mg/L	True Value	Found Value	Percent Recovery	Control Limits
Arsenic	0.5	0.4	80	80-120
Barium	0.50	0.54	108	80-120
Cadmium	0.50	0.52	104	80-120
Chromium	0.50	0.55	110	80-120
Lead	0.50	0.46	92	80-120
Mercury	0.0049	0.0052	106	80-120
Selenium	0.5	0.4	80	80-120
Silver	0.50	0.51	102	80-120
Inorganic Parameters				
Corrosivity, pH Units	6.0	6.0	100	80-120
Cyanide, mg/kg Reactive	1000	32	3.2	NA
Ignitability, Degrees F	115	116	101	80-120
Sulfide, mg/kg Reactive	1000	780	78	NA

NA = Not Applicable

Appendix C-2

Raw Analytical Data –
Precipitator Slurry/Precipitator Dust

ANALYTICA
—I-N-C-O-R-P-O-R-A-T-E-D—

ANALYTICAL RESULTS

FOR

FMC

Client ID: Precipitator Slurry
Analytica ID: 12952-1

Date Sampled: 9-26-90
Date Received: 9-29-90

TCLP Metals, mg/L	Concentration	
Arsenic	ND	(0.2)
Barium	0.09	(0.04)
Cadmium	0.21	(0.02)
Chromium	0.28	(0.04)
Lead	0.2	(0.1)
Mercury	ND	(0.002)
Selenium	ND	(0.2)
Silver	ND	(0.02)

Inorganic Parameters		
Cyanide, Reactive, mg/kg	1.8	(1.5)
Sulfide, Reactive, mg/kg	23	(5)

ND = Not Detected
Detection Limits in Parentheses

ANALYTICA
—I-N-C-O-R-P-O-R-A-T-E-D—

QUALITY CONTROL SUMMARY

DUPLICATE ANALYSIS

LGN: 12952

TCLP Metals, mg/L	Sample		Duplicate		Relative Percent Difference
Arsenic	ND	(0.2)	ND	(0.2)	NC
Barium	0.09	(0.04)	0.09	(0.04)	NC
Cadmium	0.21	(0.02)	0.21	(0.02)	0
Chromium	0.28	(0.04)	0.28	(0.04)	0
Lead	0.2	(0.1)	0.2	(0.1)	NC
Mercury	ND	(0.002)	ND	(0.002)	NC
Selenium	ND	(0.2)	ND	(0.2)	NC
Silver	ND	(0.02)	ND	(0.02)	NC
Inorganic Parameters					
Cyanide, Reactive, mg/kg	1.8	(1.5)	3.2	(1.5)	NC
Sulfide, Reactive, mg/kg	23	(5)	37	(5)	NC

NC = Not Calculated
ND = Not Detected
Detection Limits in Parentheses

ANALYTICA
—I-N-C-O-R-P-O-R-A-T-E-D—

QUALITY CONTROL SUMMARY

SPIKE ANALYSIS

LGN: 12952

TCLP Metals, mg/L	Sample Result		Spike Result	Spike Added	Percent Recovery
Arsenic	0.2	(0.2)	3.6	4.0	85
Barium	0.08	(0.04)	1.0	1.0	92
Cadmium	0.05	(0.02)	0.95	1.0	90
Chromium	0.17	(0.04)	1.0	1.0	83
Lead	ND	(0.1)	0.9	1.0	90
Mercury	ND	(0.002)	0.008	0.010	80
Selenium	ND	(0.2)	3.7	4.0	92
Silver	ND	(0.02)	0.89	1.0	89
Inorganic Parameters					
Cyanide, mg/kg Reactive	ND	(1.5)	130	1000	13
Sulfide, mg/kg Reactive	27	(5)	210	1000	18

ND = Not Detected
Detection Limits in Parentheses

ANALYTICA
—I-N-C-O-R-P-O-R-A-T-E-D—

QUALITY CONTROL SUMMARY

LABORATORY CONTROL SAMPLE

LGN: 12952

TCLP Metals, mg/L	True Value	Found Value	Percent Recovery	Control Limits
Arsenic	2.0	1.8	90	80-120
Barium	2.0	2.0	100	80-120
Cadmium	0.50	0.45	90	80-120
Chromium	0.51	0.46	90	80-120
Lead	4.8	4.4	92	80-120
Mercury	0.0050	0.0048	96	80-120
Selenium	2.0	2.0	100	80-120
Silver	0.50	0.44	88	80-120

Inorganic Parameters				
Cyanide, mg/kg Reactive	1000	63	6.3	NA
Sulfide, mg/kg Reactive	1000	69	6.9	NA

NA = Not Applicable

ANALYTICA
—I-N-C-O-R-P-O-R-A-T-E-D—

ANALYTICAL RESULTS

FOR

FMC CORPORATION

Client ID: Precipitator Slurry #74
Analytica ID: 11883-10

EP Toxicity Metals		MCL	Concentration	
Arsenic	mg/L	5.0	ND	(0.5)
Barium	mg/L	100.0	ND	(0.1)
Cadmium	mg/L	1.0	2.7	(0.05)
Chromium	mg/L	5.0	1.5	(0.1)
Lead	mg/L	5.0	1.1	(0.25)
Mercury	mg/L	0.2	ND	(0.002)
Selenium	mg/L	1.0	ND	(0.5)
Silver	mg/L	5.0	ND	(0.05)

Inorganic Parameters

Corrosivity, pH	Units	6.3	
Corrosivity, NACE	mm/yr	0.3	(0.1)
Ignitability	Degrees F	No Flash to 210	
Reactivity		Reactive	

MCL = Maximum Contaminant Level for Characterization
ND = Not Detected
Detection Limits in Paretheses

ANALYTICA
—I-N-C-O-R-P-O-R-A-T-E-D—

ANALYTICAL RESULTS

FOR

FMC CORPORATION

Client ID: Precipitator Slurry #75
Analytica ID: 11883-11

EP Toxicity Metals		MCL	Concentration	
Arsenic	mg/L	5.0	ND	(0.5)
Barium	mg/L	100.0	ND	(0.1)
Cadmium	mg/L	1.0	0.92	(0.05)
Chromium	mg/L	5.0	0.5	(0.1)
Lead	mg/L	5.0	0.5	(0.25)
Mercury	mg/L	0.2	ND	(0.002)
Selenium	mg/L	1.0	ND	(0.5)
Silver	mg/L	5.0	ND	(0.05)

Inorganic Parameters

Corrosivity, pH	Units	6.5	
Corrosivity, NACE	mm/yr	0.1	(0.1)
Ignitability	Degrees F	No Flash to 210	
Reactivity		Non-Reactive	

MCL = Maximum Contaminant Level for Characterization
ND = Not Detected
Detection Limits in Paretheses

ANALYTICA
INCORPORATED

ANALYTICAL RESULTS

FOR

FMC CORPORATION

Client ID: Precipitator Dust #2
Analytica ID: 11774-2

EP-Toxicity		Concentration	
Arsenic	mg/L	1.3	(0.2)
Barium	mg/L	ND	(0.04)
Cadmium	mg/L	6.9	(0.02)
Chromium	mg/L	0.05	(0.04)
Lead	mg/L	ND	(0.10)
Mercury	mg/L	ND	(0.002)
Selenium	mg/L	ND	(0.2)
Silver	mg/L	ND	(0.02)

ND = Not Detected
Detection Limits in Parentheses

ANALYTICA
—I—N—C—O—R—P—O—R—A—T—E—D—

ANALYTICAL RESULTS

FOR

FMC CORPORATION

Client ID: Precipitator Dust #3
Analytica ID: 11774-3

EP-Toxicity		Concentration	
Arsenic	mg/L	1.1	(0.2)
Barium	mg/L	ND	(0.04)
Cadmium	mg/L	5.9	(0.02)
Chromium	mg/L	0.05	(0.04)
Lead	mg/L	ND	(0.10)
Mercury	mg/L	ND	(0.002)
Selenium	mg/L	ND	(0.2)
Silver	mg/L	ND	(0.02)

ND = Not Detected
Detection Limits in Parentheses

ANALYTICA
INCORPORATED

ANALYTICAL RESULTS

FOR

FMC CORPORATION

Client ID: Precipitator Dust #4
Analytica ID: 11774-4

EP-Toxicity		Concentration	
Arsenic	mg/L	1.0	(0.5)
Barium	mg/L	ND	(0.1)
Cadmium	mg/L	6.5	(0.05)
Chromium	mg/L	ND	(0.1)
Lead	mg/L	ND	(0.25)
Mercury	mg/L	ND	(0.002)
Selenium	mg/L	ND	(0.5)
Silver	mg/L	ND	(0.05)

ND = Not Detected
Detection Limits in Parentheses

ANALYTICA
INCORPORATED

ANALYTICAL RESULTS

FOR

FMC CORPORATION

Client ID: Precipitator Dust #5
Analytica ID: 11774-5

EP-Toxicity		Concentration	
Arsenic	mg/L	0.9	(0.5)
Barium	mg/L	ND	(0.1)
Cadmium	mg/L	2.2	(0.05)
Chromium	mg/L	ND	(0.1)
Lead	mg/L	ND	(0.25)
Mercury	mg/L	ND	(0.002)
Selenium	mg/L	ND	(0.5)
Silver	mg/L	ND	(0.05)

ND = Not Detected
Detection Limits in Parentheses

Appendix C-3

Raw Analytical Data –
Laboratory, Paint,
and Degreasing Solvents

ANALYTICA
—I—N—C—O—R—P—O—R—A—T—E—D—

ANALYTICAL RESULTS

FOR

FMC CORPORATION

Client ID: Waste Laboratory Solvents #71
Analytica ID: 11883-7

EP Toxicity Metals		MCL	Concentration	
Arsenic	mg/L	5.0	2.8	(0.1)
Barium	mg/L	100.0	ND	(0.02)
Cadmium	mg/L	1.0	ND	(0.01)
Chromium	mg/L	5.0	1.1	(0.02)
Lead	mg/L	5.0	0.12	(0.01)
Mercury	mg/L	0.2	ND	(0.06)
Selenium	mg/L	1.0	ND	(0.1)
Silver	mg/L	5.0	ND	(0.01)

Inorganic Parameters

Corrosivity, pH	Units	NA	
Corrosivity, NACE	mm/yr	0.4	(0.1)
Ignitability	Degrees F	104	
Reactivity		Reactive	

NA = Not Applicable
MCL = Maximum Contaminant Level for Characterization
ND = Not Detected
Detection Limits in Paretheses

ANALYTICA
INCORPORATED

ANALYTICAL RESULTS

FOR

FMC CORPORATION

Client ID: Waste Paint Solvent #73
Analytica ID: 11883-9
Units: mg/L

F-Listed Solvents	Concentration	
Trichlorofluoromethane	ND	(100)
Ethyl Ether	ND	(100)
1,1,2-Trichlorotrifluoroethane	ND	(100)
Acetone	ND	(200)
Methylene Chloride	ND	(100)
Methyl Alcohol	ND	(2000)
Methyl Ethyl Ketone	1800	(100)
i-Butyl Alcohol	ND	(2000)
Ethyl Acetate	ND	(100)
Carbon Tetrachloride	ND	(100)
1,1,1-Trichloroethane	ND	(100)
Benzene	ND	(100)
n-Butyl Alcohol	ND	(2000)
Trichloroethene	ND	(100)
2-Nitropropane	ND	(200)
Methyl Isobutyl Ketone	ND	(200)
Pyridine	ND	(500)
Toluene	56000	(500)
1,1,2-Trichloroethane	ND	(100)
Tetrachloroethene	ND	(100)
Chlorobenzene	ND	(100)
Ethylbenzene	16000	(100)
Xylenes	63000	(100)
Cyclohexanone	ND	(500)
o-Dichlorobenzene	ND	(100)
Nitrobenzene	ND	(500)
o-Cresol	ND	(500)
m + p-Cresol	ND	(500)

ND = Not Detected
Detection Limits in Parentheses

ANALYTICA
INCORPORATED

ANALYTICAL RESULTS

FOR

FMC CORPORATION

Client ID: Waste Degreasing Solvent #72
Analytica ID: 11883-8
Units: mg/L

F-Listed Solvents	Concentration	
Trichlorofluoromethane	ND	(100)
Ethyl Ether	ND	(100)
1,1,2-Trichlorotrifluoroethane	ND	(100)
Acetone	ND	(200)
Methylene Chloride	67000	(2000)
Methyl Alcohol	ND	(500)
Methyl Ethyl Ketone	ND	(100)
i-Butyl Alcohol	ND	(2000)
Ethyl Acetate	ND	(100)
Carbon Tetrachloride	ND	(100)
1,1,1-Trichloroethane	610000	(2000)
Benzene	ND	(100)
n-Butyl Alcohol	ND	(2000)
Trichloroethene	ND	(100)
2-Nitropropane	ND	(200)
Methyl Isobutyl Ketone	ND	(200)
Pyridine	ND	(500)
Toluene	710	(100)
1,1,2-Trichloroethane	ND	(100)
Tetrachloroethene	3500	(100)
Chlorobenzene	ND	(100)
Ethylbenzene	2000	(100)
Xylenes	11000	(100)
Cyclohexanone	ND	(500)
o-Dichlorobenzene	ND	(100)
Nitrobenzene	ND	(500)
o-Cresol	ND	(500)
m + p-Cresol	ND	(500)

ND = Not Detected
Detection Limits in Parentheses

Appendix C-4

Raw Analytical Data –
Scrubber Blowdown Water

ANALYTICA
—I-N-C-O-R-P-O-R-A-T-E-D—

ANALYTICAL RESULTS

FOR

FMC CORPORATION

Date Sampled: 9-26-90
Date Received: 9-28-90

Client ID:	4E		2W	
Analytica ID:	12932-1		12932-2	
TCLP Metals, mg/L	Concentration		Concentration	
Arsenic	ND	(1)	ND	(1)
Barium	ND	(0.2)	ND	(0.2)
Cadmium	3.2	(0.1)	5.2	(0.1)
Chromium	1.3	(0.2)	1.0	(0.2)
Lead	ND	(0.5)	ND	(0.5)
Mercury	ND	(0.0008)	ND	(0.0008)
Selenium	ND	(1)	ND	(1)
Silver	ND	(0.1)	ND	(0.1)
Inorganic Parameters				
Corrosivity, NACE mmpy	0.09	(0.05)	0.08	(0.05)
Corrosivity, pH Units	5.8		6.3	

ND = Not Detected
Detection Limits in Parentheses

ANALYTICA
—I-N-C-O-R-P-O-R-A-T-E-D—

ANALYTICAL RESULTS

FOR

FMC CORPORATION

Date Sampled: 9-26/27-90
Date Received: 9-28-90

Client ID:	3E		4E	
Analytica ID:	12932-3		12932-4	
TCLP Metals, mg/L	Concentration		Concentration	
Arsenic	ND	(1)	ND	(1)
Barium	ND	(0.2)	ND	(0.2)
Cadmium	0.2	(0.1)	5.1	(0.1)
Chromium	1.2	(0.2)	1.6	(0.2)
Lead	ND	(0.5)	0.6	(0.5)
Mercury	ND	(0.0008)	ND	(0.0008)
Selenium	ND	(1)	ND	(1)
Silver	ND	(0.1)	ND	(0.1)
Inorganic Parameters				
Corrosivity, NACE mmpy	0.13	(0.05)	ND	(0.05)
Corrosivity, pH Units	5.9		5.4	

ND = Not Detected
Detection Limits in Parentheses

ANALYTICA
—I-N-C-O-R-P-O-R-A-T-E-D—

ANALYTICAL RESULTS

FOR

FMC CORPORATION

Date Sampled: 9-27-90
Date Received: 9-28-90

Client ID:	1W		1E	
Analytica ID:	12932-5		12932-6	
<u>TCLP Metals</u>, mg/L	<u>Concentration</u>		<u>Concentration</u>	
Arsenic	1	(1)	ND	(1)
Barium	ND	(0.2)	ND	(0.2)
Cadmium	1.7	(0.1)	1.8	(0.1)
Chromium	1.5	(0.2)	1.2	(0.2)
Lead	3.2	(0.5)	ND	(0.5)
Mercury	ND	(0.0008)	ND	(0.0008)
Selenium	ND	(1)	ND	(1)
Silver	ND	(0.1)	ND	(0.1)
<u>Inorganic Parameters</u>				
Corrosivity, NACE mmpy	0.12	(0.05)	0.14	(0.05)
Corrosivity, pH Units	6.4		5.0	

ND = Not Detected
Detection Limits in Parentheses

ANALYTICA
—I-N-C-O-R-P-O-R-A-T-E-D—

QUALITY CONTROL SUMMARY

DUPLICATE ANALYSIS

LGN: 12932

TCLP Metals, mg/L	Sample		Duplicate		Relative Percent Difference
Arsenic	ND	(1)	ND	(1)	NC
Barium	ND	(0.2)	ND	(0.2)	NC
Cadmium	5.1	(0.1)	5.2	(0.1)	1.9
Chromium	1.6	(0.2)	1.7	(0.2)	6.1
Lead	0.6	(0.5)	0.7	(0.5)	NC
Mercury	ND	(0.0008)	ND	(0.0008)	NC
Selenium	ND	(1)	ND	(1)	NC
Silver	ND	(0.1)	ND	(0.1)	NC
Inorganic Parameters					
Corrosivity, pH Units	5.8		5.8		0

NC = Not Calculated
ND = Not Detected
Detection Limits in Parentheses

ANALYTICA
INCORPORATED

QUALITY CONTROL SUMMARY

SPIKE ANALYSIS

LGN: 12932

TCLP Metals, mg/L	Sample Result		Spike Result	Spike Added	Percent Recovery
Arsenic	1	(1)	3	2.0	100
Barium	ND	(0.2)	0.6	0.50	120
Cadmium	1.7	(0.1)	2.2	0.50	100
Chromium	1.5	(0.2)	1.9	0.50	80
Lead	3.2	(0.5)	3.7	0.50	NC
Mercury	ND	(0.0008)	0.0012	0.0020	60
Selenium	ND	(1)	2	2.0	100
Silver	ND	(0.1)	0.5	0.50	100

NC = Not Calculated
ND = Not Detected
Detection Limits in Parentheses

ANALYTICA
—I-N-C-O-R-P-O-R-A-T-E-D—

QUALITY CONTROL SUMMARY

LABORATORY CONTROL SAMPLE

LGN: 12932

TCLP Metals, mg/L	True Value	Found Value	Percent Recovery	Control Limits
Arsenic	2.0	1.8	90	80-120
Barium	0.50	0.52	104	80-120
Cadmium	0.50	0.46	92	80-120
Chromium	0.50	0.48	96	80-120
Lead	0.50	0.46	92	80-120
Mercury	0.0050	0.0053	106	80-120
Selenium	2.0	2.0	100	80-120
Silver	0.50	0.43	86	80-120
Inorganic Parameters				
Corrosivity, pH Units	6.0	6.0	100	80-120

ANALYTICA
INCORPORATED

ANALYTICAL RESULTS

FOR

FMC CORPORATION

Client ID: Furnace Scrubber Blowdown #29 and #30
Analytica ID: 11775-5

EP Toxicity Metals		Concentration	
Arsenic	mg/L	0.30	(0.02)
Barium	mg/L	ND	(0.1)
Cadmium	mg/L	0.63	(0.05)
Chromium	mg/L	0.5	(0.1)
Lead	mg/L	0.36	(0.25)
Mercury	mg/L	ND	(0.0008)
Selenium	mg/L	0.10	(0.05)
Silver	mg/L	0.44	(0.05)

Inorganic Parameters			
Corrosivity, pH	Units	4.6	
Corrosivity, NACE	mm/yr	ND	(0.1)
Ignitability	Degrees F	No Flash to 200	

ND = Not Detected
Detection Limits in Parentheses

ANALYTICA
INCORPORATED

ANALYTICAL RESULTS

FOR

FMC CORPORATION

Client ID: Furnace Scrubber Blowdown #31 and #32
Analytica ID: 11775-6

EP Toxicity Metals		Concentration	
Arsenic	mg/L	0.42	(0.02)
Barium	mg/L	0.2	(0.1)
Cadmium	mg/L	1.5	(0.05)
Chromium	mg/L	2.2	(0.1)
Lead	mg/L	0.42	(0.25)
Mercury	mg/L	ND	(0.0008)
Selenium	mg/L	ND	(0.1)
Silver	mg/L	2.8	(0.05)

Inorganic Parameters			
Corrosivity, pH	Units	2.3	
Corrosivity, NACE	mm/yr	2.8	(0.1)
Ignitability	Degrees F	No Flash to 200	

ND = Not Detected
Detection Limits in Parentheses

ANALYTICA
INCORPORATED

ANALYTICAL RESULTS

FOR

FMC CORPORATION

Client ID: Phos Dock Scrubber Blowdown #25 and #26
Analytica ID: 11775-3

EP Toxicity Metals		Concentration	
Arsenic	mg/L	0.6	(0.1)
Barium	mg/L	0.13	(0.02)
Cadmium	mg/L	2.9	(0.01)
Chromium	mg/L	0.64	(0.02)
Lead	mg/L	0.34	(0.05)
Mercury	mg/L	ND	(0.0008)
Selenium	mg/L	ND	(0.1)
Silver	mg/L	0.18	(0.01)

Inorganic Parameters		
Corrosivity, pH	Units	1.7
Ignitability	Degrees F	No Flash to 200

ND = Not Detected
Detection Limits in Parentheses

ANALYTICA
INCORPORATED

ANALYTICAL RESULTS

FOR

FMC CORPORATION

Client ID: Phos Dock Scrubber Blowdown #27 and #28
Analytica ID: 11775-4

EP Toxicity Metals		Concentration	
Arsenic	mg/L	0.6	(0.1)
Barium	mg/L	0.13	(0.02)
Cadmium	mg/L	3.0	(0.01)
Chromium	mg/L	0.67	(0.02)
Lead	mg/L	0.37	(0.05)
Mercury	mg/L	ND	(0.0008)
Selenium	mg/L	ND	(0.05)
Silver	mg/L	0.18	(0.01)

Inorganic Parameters		
Corrosivity, pH	Units	1.7
Ignitability	Degrees F	No Flash to 200

ND = Not Detected
Detection Limits in Parentheses

Appendix C-5

Raw Analytical Data –
Phossy Water

ANALYTICA
—I-N-C-O-R-P-O-R-A-T-E-D—

ANALYTICAL RESULTS

FOR

FMC

Client ID: Tiger Pit-4
Analytica ID: 12952-3

Date Sampled: 9-26-90
Date Received: 9-29-90

TCLP Metals, mg/L	Concentration	
Arsenic	ND	(0.2)
Barium	0.09	(0.04)
Cadmium	0.02	(0.02)
Chromium	0.20	(0.04)
Lead	ND	(0.1)
Mercury	ND	(0.002)
Selenium	ND	(0.2)
Silver	ND	(0.02)

Inorganic Parameters		
Cyanide, Reactive, mg/kg	ND	(1.5)
Sulfide, Reactive, mg/kg	ND	(5)

ND = Not Detected
Detection Limits in Parentheses

ANALYTICA
—I-N-C-O-R-P-O-R-A-T-E-D—

ANALYTICAL RESULTS

FOR

FMC

Client ID: Phossy Water
Analytica ID: 12952-4

Date Sampled: 9-26-90
Date Received: 9-29-90

TCLP Metals, mg/L	Concentration	
Arsenic	ND	(0.4)
Barium	0.13	(0.08)
Cadmium	0.06	(0.04)
Chromium	0.41	(0.08)
Lead	ND	(0.2)
Mercury	ND	(0.002)
Selenium	ND	(0.4)
Silver	ND	(0.04)

Inorganic Parameters		
Cyanide, Reactive, mg/kg	1.9	(1.5)
Sulfide, Reactive, mg/kg	45	(5)

ND = Not Detected
Detection Limits in Parentheses

ANALYTICA
—I-N-C-O-R-P-O-R-A-T-E-D—

ANALYTICAL RESULTS

FOR

FMC

Client ID: Slag Pit WW Collection Sump
Analytica ID: 12952-5

Date Sampled: 9-26-90
Date Received: 9-29-90

TCLP Metals, mg/L	Concentration	
Arsenic	ND	(0.5)
Barium	0.1	(0.1)
Cadmium	ND	(0.05)
Chromium	0.3	(0.1)
Lead	ND	(0.3)
Mercury	ND	(0.002)
Selenium	ND	(0.5)
Silver	ND	(0.05)

Inorganic Parameters

Cyanide, Reactive, mg/kg	ND	(1.5)
Sulfide, Reactive, mg/kg	8	(5)

ND = Not Detected
Detection Limits in Parentheses

ANALYTICA
—I-N-C-O-R-P-O-R-A-T-E-D—

QUALITY CONTROL SUMMARY

DUPLICATE ANALYSIS

LGN: 12952

TCLP Metals, mg/L	Sample		Duplicate		Relative Percent Difference
Arsenic	ND	(0.2)	ND	(0.2)	NC
Barium	0.09	(0.04)	0.09	(0.04)	NC
Cadmium	0.21	(0.02)	0.21	(0.02)	0
Chromium	0.28	(0.04)	0.28	(0.04)	0
Lead	0.2	(0.1)	0.2	(0.1)	NC
Mercury	ND	(0.002)	ND	(0.002)	NC
Selenium	ND	(0.2)	ND	(0.2)	NC
Silver	ND	(0.02)	ND	(0.02)	NC
Inorganic Parameters					
Cyanide, Reactive, mg/kg	1.8	(1.5)	3.2	(1.5)	NC
Sulfide, Reactive, mg/kg	23	(5)	37	(5)	NC

NC = Not Calculated
ND = Not Detected
Detection Limits in Parentheses

ANALYTICA
—I-N-C-O-R-P-O-R-A-T-E-D—

QUALITY CONTROL SUMMARY

SPIKE ANALYSIS

LGN: 12952

TCLP Metals, mg/L	Sample Result		Spike Result	Spike Added	Percent Recovery
Arsenic	0.2	(0.2)	3.6	4.0	85
Barium	0.08	(0.04)	1.0	1.0	92
Cadmium	0.05	(0.02)	0.95	1.0	90
Chromium	0.17	(0.04)	1.0	1.0	83
Lead	ND	(0.1)	0.9	1.0	90
Mercury	ND	(0.002)	0.008	0.010	80
Selenium	ND	(0.2)	3.7	4.0	92
Silver	ND	(0.02)	0.89	1.0	89
Inorganic Parameters					
Cyanide, mg/kg Reactive	ND	(1.5)	130	1000	13
Sulfide, mg/kg Reactive	27	(5)	210	1000	18

ND = Not Detected
Detection Limits in Parentheses

ANALYTICA
—I-N-C-O-R-P-O-R-A-T-E-D—

QUALITY CONTROL SUMMARY

LABORATORY CONTROL SAMPLE

LGN: 12952

TCLP Metals, mg/L	True Value	Found Value	Percent Recovery	Control Limits
Arsenic	2.0	1.8	90	80-120
Barium	2.0	2.0	100	80-120
Cadmium	0.50	0.45	90	80-120
Chromium	0.51	0.46	90	80-120
Lead	4.8	4.4	92	80-120
Mercury	0.0050	0.0048	96	80-120
Selenium	2.0	2.0	100	80-120
Silver	0.50	0.44	88	80-120

Inorganic Parameters				
Cyanide, mg/kg Reactive	1000	63	6.3	NA
Sulfide, mg/kg Reactive	1000	69	6.9	NA

NA = Not Applicable

ANALYTICA
—I—N—C—O—R—P—O—R—A—T—E—D—

ANALYTICAL RESULTS

FOR

FMC CORPORATION

Client ID: Nonclarified Phossy Water #47
Analytica ID: 11882-5

EP Toxicity		MCL	Concentration	
Arsenic	mg/L	5.0	ND	(0.2)
Barium	mg/L	100.0	ND	(0.04)
Cadmium	mg/L	1.0	0.09	(0.02)
Chromium	mg/L	5.0	0.11	(0.04)
Lead	mg/L	5.0	ND	(0.1)
Mercury	mg/L	0.2	ND	(0.002)
Selenium	mg/L	1.0	ND	(0.2)
Silver	mg/L	5.0	ND	(0.02)

Inorganic Parameters			
Corrosivity, pH	Units	5.0	
Corrosivity, NACE	mm/yr	ND	(0.1)
Ignitability	Degrees F	No Flash to 210	
Reactivity		Non-Reactive	

MCL = Maximum Contaminant Level for Characterization
ND = Not Detected
Detection Limits in Paretheses

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ANALYTICA
—I-N-C-O-R-P-O-R-A-T-E-D—

ANALYTICAL RESULTS

FOR

FMC CORPORATION

Client ID: Nonclarified Phossy Water #49
Analytica ID: 11882-7

EP Toxicity		MCL	Concentration	
Arsenic	mg/L	5.0	ND	(0.2)
Barium	mg/L	100.0	ND	(0.04)
Cadmium	mg/L	1.0	0.14	(0.02)
Chromium	mg/L	5.0	0.13	(0.04)
Lead	mg/L	5.0	ND	(0.1)
Mercury	mg/L	0.2	ND	(0.002)
Selenium	mg/L	1.0	ND	(0.2)
Silver	mg/L	5.0	ND	(0.02)

Inorganic Parameters			
Corrosivity, pH	Units	4.6	
Corrosivity, NACE	mm/yr	ND	(0.1)
Ignitability	Degrees F	No Flash to 210	
Reactivity		Non-Reactive	

MCL = Maximum Contaminant Level for Characterization
ND = Not Detected
Detection Limits in Paretheses

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ANALYTICA
INCORPORATED

ANALYTICAL RESULTS

FOR

FMC CORPORATION

Client ID: Nonclarified Phossy Water #50
Analytica ID: 11882-8

EP Toxicity		MCL	Concentration	
Arsenic	mg/L	5.0	ND	(0.2)
Barium	mg/L	100.0	ND	(0.04)
Cadmium	mg/L	1.0	0.06	(0.02)
Chromium	mg/L	5.0	0.12	(0.04)
Lead	mg/L	5.0	ND	(0.1)
Mercury	mg/L	0.2	ND	(0.002)
Selenium	mg/L	1.0	ND	(0.2)
Silver	mg/L	5.0	ND	(0.02)

Inorganic Parameters			
Corrosivity, pH	Units	4.8	
Corrosivity, NACE	mm/yr	ND	(0.1)
Ignitability	Degrees F	No Flash to 210	
Reactivity		Non-Reactive	

MCL = Maximum Contaminant Level for Characterization
ND = Not Detected
Detection Limits in Paretheses

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ANALYTICA
INCORPORATED

ANALYTICAL RESULTS

FOR

FMC CORPORATION

Client ID: Clarified Phossy Water - Pond 14S #53
Analytica ID: 11882-11

EP Toxicity		MCL	Concentration	
Arsenic	mg/L	5.0	ND	(1)
Barium	mg/L	100.0	ND	(0.2)
Cadmium	mg/L	1.0	0.6	(0.1)
Chromium	mg/L	5.0	0.2	(0.2)
Lead	mg/L	5.0	0.10	(0.02)
Mercury	mg/L	0.2	0.0005	(0.0004)
Selenium	mg/L	1.0	ND	(0.1)
Silver	mg/L	5.0	ND	(0.1)

Inorganic Parameters			
Corrosivity, pH	Units	6.3	
Corrosivity, NACE	mm/yr	ND	(0.1)
Ignitability	Degrees F	No Flash to 210	
Reactivity		Non-Reactive	

MCL = Maximum Contaminant Level for Characterization
ND = Not Detected
Detection Limits in Paretheses

ANALYTICA
INCORPORATED

ANALYTICAL RESULTS

FOR

FMC CORPORATION

Client ID: Clarified Phossy Water - Pond 14S #55
Analytica ID: 11882-13

EP Toxicity		MCL	Concentration	
Arsenic	mg/L	5.0	ND	(1)
Barium	mg/L	100.0	ND	(0.2)
Cadmium	mg/L	1.0	0.5	(0.1)
Chromium	mg/L	5.0	0.2	(0.2)
Lead	mg/L	5.0	0.063	(0.005)
Mercury	mg/L	0.2	0.0009	(0.0004)
Selenium	mg/L	1.0	ND	(0.1)
Silver	mg/L	5.0	ND	(0.1)

Inorganic Parameters		
Corrosivity, pH	Units	6.3
Corrosivity, NACE	mm/yr	ND (0.1)
Ignitability	Degrees F	No Flash to 210
Reactivity		Non-Reactive

MCL = Maximum Contaminant Level for Characterization
ND = Not Detected
Detection Limits in Paretheses

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ANALYTICA
INCORPORATED

ANALYTICAL RESULTS

FOR

FMC CORPORATION

Client ID: Phossy Water - Pond 15S #57
Analytica ID: 11882-15

EP Toxicity		MCL	Concentration	
Arsenic	mg/L	5.0	0.9	(0.2)
Barium	mg/L	100.0	ND	(0.2)
Cadmium	mg/L	1.0	1.9	(0.1)
Chromium	mg/L	5.0	1.4	(0.2)
Lead	mg/L	5.0	0.98	(0.04)
Mercury	mg/L	0.2	0.0004	(0.0004)
Selenium	mg/L	1.0	ND	(0.2)
Silver	mg/L	5.0	ND	(0.1)

Inorganic Parameters			
Corrosivity, pH	Units	6.9	
Corrosivity, NACE	mm/yr	ND	(0.1)
Ignitability	Degrees F	No Flash to 210	
Reactivity		Non-Reactive	

MCL = Maximum Contaminant Level for Characterization
ND = Not Detected
Detection Limits in Paretheses

ANALYTICA
INCORPORATED

ANALYTICAL RESULTS

FOR

FMC CORPORATION

Client ID: Phossy Water - Pond 15S #59
Analytica ID: 11882-17

EP Toxicity		MCL	Concentration	
Arsenic	mg/L	5.0	ND	(1)
Barium	mg/L	100.0	ND	(0.2)
Cadmium	mg/L	1.0	2.0	(0.1)
Chromium	mg/L	5.0	1.5	(0.2)
Lead	mg/L	5.0	0.65	(0.05)
Mercury	mg/L	0.2	0.0006	(0.0004)
Selenium	mg/L	1.0	ND	(0.002)
Silver	mg/L	5.0	0.1	(0.1)

Inorganic Parameters

Corrosivity, pH	Units	6.9	
Corrosivity, NACE	mm/yr	ND	(0.1)
Ignitability	Degrees F	98	
Reactivity		Non-Reactive	

MCL = Maximum Contaminant Level for Characterization
ND = Not Detected
Detection Limits in Paretheses

ANALYTICA
INCORPORATED

ANALYTICAL RESULTS

FOR

FMC CORPORATION

Client ID: Slag Pit Phossy Water - Tiger 8 #61
Analytica ID: 11882-19

EP Toxicity		MCL	Concentration	
Arsenic	mg/L	5.0	ND	(0.2)
Barium	mg/L	100.0	ND	(0.04)
Cadmium	mg/L	1.0	0.22	(0.02)
Chromium	mg/L	5.0	0.15	(0.04)
Lead	mg/L	5.0	ND	(0.1)
Mercury	mg/L	0.2	ND	(0.002)
Selenium	mg/L	1.0	ND	(0.2)
Silver	mg/L	5.0	ND	(0.02)

Inorganic Parameters

Corrosivity, pH	Units	6.4
Corrosivity, NACE	mm/yr	ND (0.1)
Ignitability	Degrees F	No Flash to 210
Reactivity		Reactive

MCL = Maximum Contaminant Level for Characterization
ND = Not Detected
Detection Limits in Paretheses

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ANALYTICA
—I—N—C—O—R—P—O—R—A—T—E—D—

ANALYTICAL RESULTS

FOR

FMC CORPORATION

Client ID: Slag Pit Phossy Water - Tiger 8 #62
Analytica ID: 11882-20

EP Toxicity		MCL	Concentration	
Arsenic	mg/L	5.0	ND	(0.2)
Barium	mg/L	100.0	ND	(0.04)
Cadmium	mg/L	1.0	1.7	(0.02)
Chromium	mg/L	5.0	0.26	(0.04)
Lead	mg/L	5.0	ND	(0.1)
Mercury	mg/L	0.2	ND	(0.002)
Selenium	mg/L	1.0	ND	(0.2)
Silver	mg/L	5.0	ND	(0.02)

Inorganic Parameters

Inorganic Parameters			
Corrosivity, pH	Units	6.5	
Corrosivity, NACE	mm/yr	ND	(0.1)
Ignitability	Degrees F	No Flash to 210	
Reactivity		Reactive	

MCL = Maximum Contaminant Level for Characterization
ND = Not Detected
Detection Limits in Paretheses

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ANALYTICA
—I—N—C—O—R—P—O—R—A—T—E—D—

ANALYTICAL RESULTS

FOR

FMC CORPORATION

Client ID: Slag Pit Phossy Water #65
Analytica ID: 11883-3

EP Toxicity Metals		MCL	Concentration	
Arsenic	mg/L	5.0	ND	(0.2)
Barium	mg/L	100.0	ND	(0.04)
Cadmium	mg/L	1.0	0.03	(0.02)
Chromium	mg/L	5.0	0.08	(0.04)
Lead	mg/L	5.0	ND	(0.1)
Mercury	mg/L	0.2	ND	(0.002)
Selenium	mg/L	1.0	ND	(0.2)
Silver	mg/L	5.0	ND	(0.02)

Inorganic Parameters

Corrosivity, pH	Units	8.7
Corrosivity, NACE	mm/yr	ND (0.1)
Ignitability	Degrees F	No Flash to 210
Reactivity		Reactive

MCL = Maximum Contaminant Level for Characterization
ND = Not Detected
Detection Limits in Paretheses

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ANALYTICA
—I-N-C-O-R-P-O-R-A-T-E-D—

ANALYTICAL RESULTS

FOR

FMC CORPORATION

Client ID: Slag Pit Phossy Water #66
Analytica ID: 11883-4

EP Toxicity Metals		MCL	Concentration	
Arsenic	mg/L	5.0	ND	(0.2)
Barium	mg/L	100.0	ND	(0.04)
Cadmium	mg/L	1.0	0.03	(0.02)
Chromium	mg/L	5.0	ND	(0.04)
Lead	mg/L	5.0	ND	(0.1)
Mercury	mg/L	0.2	ND	(0.002)
Selenium	mg/L	1.0	ND	(0.2)
Silver	mg/L	5.0	ND	(0.02)

Inorganic Parameters			
Corrosivity, pH	Units	8.8	
Corrosivity, NACE	mm/yr	ND	(0.1)
Ignitability	Degrees F	No Flash to 210	
Reactivity		Non-Reactive	

MCL = Maximum Contaminant Level for Characterization
ND = Not Detected
Detection Limits in Paretheses

Appendix C-6

Raw Analytical Data –
Non-hazardous Wastes

ANALYTICA
INCORPORATED

ANALYTICAL RESULTS

FOR

FMC CORPORATION

Client ID: Crushed Ferrophos #8
Analytica ID: 11774-8

EP-Toxicity		Concentration	
Arsenic	mg/L	ND	(0.1)
Barium	mg/L	0.02	(0.02)
Cadmium	mg/L	ND	(0.01)
Chromium	mg/L	ND	(0.02)
Lead	mg/L	ND	(0.05)
Mercury	mg/L	ND	(0.002)
Selenium	mg/L	ND	(0.1)
Silver	mg/L	ND	(0.01)

Inorganic Parameters

Corrosivity, pH	Units	8.0
Ignitability	Degrees F	No Flash to 200

ND = Not Detected
Detection Limits in Parentheses

ANALYTICA
INCORPORATED

ANALYTICAL RESULTS

FOR

FMC CORPORATION

Client ID: Crushed Ferrophos #9
Analytica ID: 11774-9

EP-Toxicity		Concentration	
Arsenic	mg/L	ND	(0.1)
Barium	mg/L	0.05	(0.02)
Cadmium	mg/L	ND	(0.01)
Chromium	mg/L	ND	(0.02)
Lead	mg/L	ND	(0.05)
Mercury	mg/L	ND	(0.002)
Selenium	mg/L	ND	(0.1)
Silver	mg/L	ND	(0.01)

Inorganic Parameters		
Corrosivity, pH	Units	5.4
Ignitability	Degrees F	No Flash to 200

ND = Not Detected
Detection Limits in Parentheses

ANALYTICA
INCORPORATED

ANALYTICAL RESULTS

FOR

FMC

Client ID: 8S Recovery Process
Analytica ID: 12952-2

Date Sampled: 9-26-90
Date Received: 9-29-90

TCLP Metals, mg/L	Concentration	
Arsenic	0.2	(0.2)
Barium	0.08	(0.04)
Cadmium	0.05	(0.02)
Chromium	0.17	(0.04)
Lead	ND	(0.1)
Mercury	ND	(0.002)
Selenium	ND	(0.2)
Silver	ND	(0.02)

Inorganic Parameters		
Cyanide, Reactive, mg/kg	ND	(1.5)
Sulfide, Reactive, mg/kg	27	(5)

ND = Not Detected
Detection Limits in Parentheses

ANALYTICA
INCORPORATED

ANALYTICAL RESULTS

FOR

FMC

Client ID: 8S Recovery Process
Analytica ID: 12952-6

Date Sampled: 9-27-90
Date Received: 9-29-90

TCLP Metals, mg/L	Concentration	
Arsenic	ND	(1.0)
Barium	ND	(0.2)
Cadmium	0.1	(0.1)
Chromium	1.1	(0.2)
Lead	ND	(0.5)
Mercury	ND	(0.002)
Selenium	ND	(1.0)
Silver	ND	(0.1)

Inorganic Parameters		
Cyanide, Reactive, mg/kg	ND	(1.5)
Sulfide, Reactive, mg/kg	21	(5)

ND = Not Detected
Detection Limits in Parentheses

ANALYTICA
—I-N-C-O-R-P-O-R-A-T-E-D—

ANALYTICAL RESULTS

FOR

FMC

Client ID: Lab (FMC) Blank
Analytica ID: 12952-7

Date Sampled: 9-27-90
Date Received: 9-29-90

TCLP Metals, mg/L	Concentration	
Arsenic	ND	(0.1)
Barium	0.04	(0.02)
Cadmium	ND	(0.01)
Chromium	ND	(0.02)
Lead	ND	(0.05)
Mercury	ND	(0.0004)
Selenium	ND	(0.1)
Silver	ND	(0.01)

ND = Not Detected
Detection Limits in Parentheses

ANALYTICA
—I-N-C-O-R-P-O-R-A-T-E-D—

ANALYTICAL RESULTS

FOR

FMC

Analytica ID: Extraction Blank

TCLP Metals, mg/L	Concentration	
Arsenic	ND	(0.2)
Barium	ND	(0.04)
Cadmium	ND	(0.02)
Chromium	ND	(0.04)
Lead	ND	(0.1)
Mercury	ND	(0.002)
Selenium	ND	(0.2)
Silver	ND	(0.02)

ND = Not Detected
Detection Limits in Parentheses

ANALYTICA
INCORPORATED

QUALITY CONTROL SUMMARY

DUPLICATE ANALYSIS

LGN: 12952

TCLP Metals, mg/L	Sample		Duplicate		Relative Percent Difference
Arsenic	ND	(0.2)	ND	(0.2)	NC
Barium	0.09	(0.04)	0.09	(0.04)	NC
Cadmium	0.21	(0.02)	0.21	(0.02)	0
Chromium	0.28	(0.04)	0.28	(0.04)	0
Lead	0.2	(0.1)	0.2	(0.1)	NC
Mercury	ND	(0.002)	ND	(0.002)	NC
Selenium	ND	(0.2)	ND	(0.2)	NC
Silver	ND	(0.02)	ND	(0.02)	NC
Inorganic Parameters					
Cyanide, Reactive, mg/kg	1.8	(1.5)	3.2	(1.5)	NC
Sulfide, Reactive, mg/kg	23	(5)	37	(5)	NC

NC = Not Calculated
ND = Not Detected
Detection Limits in Parentheses

ANALYTICA
—I-N-C-O-R-P-O-R-A-T-E-D—

QUALITY CONTROL SUMMARY

SPIKE ANALYSIS

LGN: 12952

TCLP Metals, mg/L	Sample Result		Spike Result	Spike Added	Percent Recovery
Arsenic	0.2	(0.2)	3.6	4.0	85
Barium	0.08	(0.04)	1.0	1.0	92
Cadmium	0.05	(0.02)	0.95	1.0	90
Chromium	0.17	(0.04)	1.0	1.0	83
Lead	ND	(0.1)	0.9	1.0	90
Mercury	ND	(0.002)	0.008	0.010	80
Selenium	ND	(0.2)	3.7	4.0	92
Silver	ND	(0.02)	0.89	1.0	89

Inorganic Parameters					
Cyanide, mg/kg Reactive	ND	(1.5)	130	1000	13
Sulfide, mg/kg Reactive	27	(5)	210	1000	18

ND = Not Detected
Detection Limits in Parentheses

ANALYTICA
—I-N-C-O-R-P-O-R-A-T-E-D—

QUALITY CONTROL SUMMARY

LABORATORY CONTROL SAMPLE

LGN: 12952

TCLP Metals, mg/L	True Value	Found Value	Percent Recovery	Control Limits
Arsenic	2.0	1.8	90	80-120
Barium	2.0	2.0	100	80-120
Cadmium	0.50	0.45	90	80-120
Chromium	0.51	0.46	90	80-120
Lead	4.8	4.4	92	80-120
Mercury	0.0050	0.0048	96	80-120
Selenium	2.0	2.0	100	80-120
Silver	0.50	0.44	88	80-120

Inorganic Parameters				
Cyanide, mg/kg Reactive	1000	63	6.3	NA
Sulfide, mg/kg Reactive	1000	69	6.9	NA

NA = Not Applicable

ANALYTICA
—I—N—C—O—R—P—O—R—A—T—E—D—

ANALYTICAL RESULTS

FOR

FMC CORPORATION

Client ID: Phossy Wastes - Pond 11S #34
Analytica ID: 11865-2

EP Toxicity		MCL	Concentration	
Arsenic	mg/L	5.0	0.60	(0.2)
Barium	mg/L	100.0	ND	(0.04)
Cadmium	mg/L	1.0	0.07	(0.02)
Chromium	mg/L	5.0	0.18	(0.04)
Lead	mg/L	5.0	ND	(0.1)
Mercury	mg/L	0.2	ND	(0.002)
Selenium	mg/L	1.0	ND	(0.2)
Silver	mg/L	5.0	ND	(0.02)

Inorganic Parameters		
Corrosivity, pH	Units	6.9
Corrosivity, NACE	mm/yr	0.5 (0.1)
Ignitability	Degrees F	No Flash to 210
Reactivity		Reactive

MCL = Maximum Contaminant Level for Characterization
ND = Not Detected
Detection Limits in Paretheses

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ANALYTICA
—I-N-C-O-R-P-O-R-A-T-E-D—

ANALYTICAL RESULTS

FOR

FMC CORPORATION

Client ID: Phossy Wastes - Pond 12S #35
Analytica ID: 11865-3

EP Toxicity		MCL	Concentration	
Arsenic	mg/L	5.0	0.2	(0.2)
Barium	mg/L	100.0	ND	(0.04)
Cadmium	mg/L	1.0	0.26	(0.02)
Chromium	mg/L	5.0	0.11	(0.04)
Lead	mg/L	5.0	ND	(0.1)
Mercury	mg/L	0.2	ND	(0.002)
Selenium	mg/L	1.0	ND	(0.2)
Silver	mg/L	5.0	ND	(0.02)

Inorganic Parameters

Corrosivity, pH	Units	6.8	
Corrosivity, NACE	mm/yr	0.1	(0.1)
Ignitability	Degrees F	No Flash to 210	
Reactivity		Reactive	

MCL = Maximum Contaminant Level for Characterization
ND = Not Detected
Detection Limits in Paretheses

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ANALYTICA
INCORPORATED

ANALYTICAL RESULTS

FOR

FMC CORPORATION

Client ID: Phossy Wastes - Pond 12S #36
Analytica ID: 11865-4

EP Toxicity		MCL	Concentration	
Arsenic	mg/L	5.0	0.2	(0.2)
Barium	mg/L	100.0	ND	(0.04)
Cadmium	mg/L	1.0	0.16	(0.02)
Chromium	mg/L	5.0	0.07	(0.04)
Lead	mg/L	5.0	ND	(0.1)
Mercury	mg/L	0.2	ND	(0.002)
Selenium	mg/L	1.0	ND	(0.2)
Silver	mg/L	5.0	ND	(0.02)

Inorganic Parameters			
Corrosivity, pH	Units	7.1	
Corrosivity, NACE	mm/yr	0.1	(0.1)
Ignitability	Degrees F	No Flash to 210	
Reactivity		Reactive	

MCL = Maximum Contaminant Level for Characterization
ND = Not Detected
Detection Limits in Paretheses

ANALYTICA
—I-N-C-O-R-P-O-R-A-T-E-D—

ANALYTICAL RESULTS

FOR

FMC CORPORATION

Client ID: Phossy Wastes - Pond 13S #37
Analytica ID: 11865-5

EP Toxicity		MCL	Concentration	
Arsenic	mg/L	5.0	ND	(0.1)
Barium	mg/L	100.0	ND	(0.02)
Cadmium	mg/L	1.0	0.04	(0.01)
Chromium	mg/L	5.0	0.03	(0.02)
Lead	mg/L	5.0	ND	(0.05)
Mercury	mg/L	0.2	ND	(0.002)
Selenium	mg/L	1.0	ND	(0.1)
Silver	mg/L	5.0	ND	(0.01)

Inorganic Parameters

Corrosivity, pH	Units	6.8	
Corrosivity, NACE	mm/yr	0.5	(0.1)
Ignitability	Degrees F	No Flash to 210	
Reactivity		Reactive	

MCL = Maximum Contaminant Level for Characterization
ND = Not Detected
Detection Limits in Paretheses

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ANALYTICA
—I-N-C-O-R-P-O-R-A-T-E-D—

ANALYTICAL RESULTS

FOR

FMC CORPORATION

Client ID: Phossy Wastes - Pond 13S #38
Analytica ID: 11865-6

EP Toxicity		MCL	Concentration	
Arsenic	mg/L	5.0	ND	(0.1)
Barium	mg/L	100.0	ND	(0.02)
Cadmium	mg/L	1.0	0.04	(0.01)
Chromium	mg/L	5.0	0.04	(0.02)
Lead	mg/L	5.0	ND	(0.05)
Mercury	mg/L	0.2	ND	(0.002)
Selenium	mg/L	1.0	ND	(0.1)
Silver	mg/L	5.0	ND	(0.01)

Inorganic Parameters			
Corrosivity, pH	Units	6.5	
Corrosivity, NACE	mm/yr	0.8	(0.1)
Ignitability	Degrees F	No Flash to 210	
Reactivity		Reactive	

MCL = Maximum Contaminant Level for Characterization
ND = Not Detected
Detection Limits in Paretheses

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ANALYTICA
INCORPORATED

ANALYTICAL RESULTS

FOR

FMC CORPORATION

Client ID: Phossy Wastes - Pond 15S #39
Analytica ID: 11865-7

EP Toxicity		MCL	Concentration	
Arsenic	mg/L	5.0	0.2	(0.1)
Barium	mg/L	100.0	ND	(0.02)
Cadmium	mg/L	1.0	0.14	(0.01)
Chromium	mg/L	5.0	0.14	(0.02)
Lead	mg/L	5.0	ND	(0.05)
Mercury	mg/L	0.2	ND	(0.002)
Selenium	mg/L	1.0	ND	(0.1)
Silver	mg/L	5.0	ND	(0.01)

Inorganic Parameters			
Corrosivity, pH	Units	7.9	
Corrosivity, NACE	mm/yr	0.4	(0.1)
Ignitability	Degrees F	No Flash to 210	
Reactivity		Non-Reactive	

MCL = Maximum Contaminant Level for Characterization
ND = Not Detected
Detection Limits in Paretheses

ANALYTICA
INCORPORATED

ANALYTICAL RESULTS

FOR

FMC CORPORATION

Client ID: Phossy Wastes - Pond 15S #40
Analytica ID: 11865-8

EP Toxicity		MCL	Concentration	
Arsenic	mg/L	5.0	0.2	(0.1)
Barium	mg/L	100.0	0.02	(0.02)
Cadmium	mg/L	1.0	0.17	(0.01)
Chromium	mg/L	5.0	0.12	(0.02)
Lead	mg/L	5.0	ND	(0.05)
Mercury	mg/L	0.2	ND	(0.002)
Selenium	mg/L	1.0	ND	(0.1)
Silver	mg/L	5.0	ND	(0.01)

Inorganic Parameters			
Corrosivity, pH	Units	7.4	
Corrosivity, NACE	mm/yr	0.4	(0.1)
Ignitability	Degrees F	No Flash to 210	
Reactivity		Reactive	

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ND = Not Detected
Detection Limits in Paretheses

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ANALYTICA
INCORPORATED

ANALYTICAL RESULTS

FOR

FMC CORPORATION

Client ID: Phossy Material - Pond 8S #41
Analytica ID: 11865-9

EP Toxicity		MCL	Concentration	
Arsenic	mg/L	5.0	0.2	(0.1)
Barium	mg/L	100.0	ND	(0.02)
Cadmium	mg/L	1.0	0.07	(0.01)
Chromium	mg/L	5.0	0.08	(0.02)
Lead	mg/L	5.0	ND	(0.05)
Mercury	mg/L	0.2	ND	(0.002)
Selenium	mg/L	1.0	ND	(0.1)
Silver	mg/L	5.0	ND	(0.01)

Inorganic Parameters			
Corrosivity, pH	Units	7.8	
Corrosivity, NACE	mm/yr	0.4	(0.1)
Ignitability	Degrees F	No Flash to 210	
Reactivity		Reactive	

MCL = Maximum Contaminant Level for Characterization
ND = Not Detected
Detection Limits in Paretheses

ANALYTICA
—I—N—C—O—R—P—O—R—A—T—E—D—

ANALYTICAL RESULTS

FOR

FMC CORPORATION

Client ID: Phossy Material - Pond 8S #42
Analytica ID: 11865-10

EP Toxicity		MCL	Concentration	
Arsenic	mg/L	5.0	0.2	(0.1)
Barium	mg/L	100.0	ND	(0.02)
Cadmium	mg/L	1.0	0.09	(0.01)
Chromium	mg/L	5.0	0.05	(0.02)
Lead	mg/L	5.0	ND	(0.05)
Mercury	mg/L	0.2	ND	(0.002)
Selenium	mg/L	1.0	ND	(0.1)
Silver	mg/L	5.0	ND	(0.01)

Inorganic Parameters

Corrosivity, pH	Units	8.0	
Corrosivity, NACE	mm/yr	0.4	(0.1)
Ignitability	Degrees F	No Flash to 210	
Reactivity		Reactive	

MCL = Maximum Contaminant Level for Characterization
ND = Not Detected
Detection Limits in Paretheses

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